AXIOMTEK

MANO111 Series

AMD Embedded R-Series APU
Mini ITX SBC

User's Manual

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If you replace wrong batteries, it causes the danger of explosion. It is recommended by the manufacturer that you follow the manufacturer's instructions to only replace the same or equivalent type of battery, and dispose of used ones.

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ESD Precautions

Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. It discharges static electricity from your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

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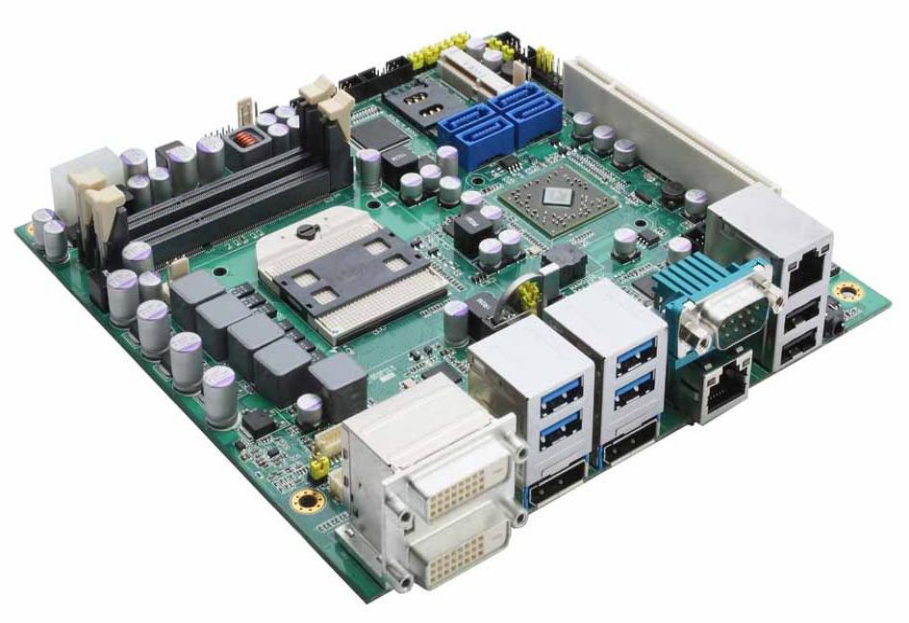
Chapter 1
Introduction



The MANO111 Series supports AMD R-Series APU. The board integrates the Fusion Controller Hub A75 and delivers outstanding system performance through high-bandwidth interfaces, multiple I/O functions for interactive applications and various embedded computing solutions.

There are two 204-pin unbuffered SO-DIMM sockets for dual channel DDR3 with frequency up to 1600MT/s, maximum memory capacity up to 16GB. It also features two Gigabit/Fast Ethernet ports, four serial ATA channels at maximum transfer rate up to 6Gb/s, four USB 3.0 and ten USB 2.0 high speed compliant, and built-in HD audio codec that can achieve the best stability and reliability for industrial applications. Additionally, it provides you with unique embedded features, such as 5 serial ports and Mini ITX form factor that supports an extensive array of PC peripherals.

1.1 Features

- FS1r2 socket AMD Embedded R-Series APU
- AMD A75 PCH
- Integrated graphics AMD Radeon HD 7000 series
- DDR3 dual channel SO-DIMM 1333/1600 max. up to 16GB
- 4 SATA-600 support RAID 0, 1 and 10
- 4 USB 3.0 supported
- 3 independent displays
- DisplayPort 2 supports multi-stream
- TPM 1.2 supported

1.2 Specifications

- **CPU**
  - AMD R-Series processor.

- **CPU Socket**
  - AMD FS1r2 socket.

- **System Chipset**
  - AMD A75 FCH.

- **BIOS**
  - American Megatrends Inc. BIOS.
  - 32Mbit SPI Flash, DMI, Plug and Play.
  - PXE Ethernet Boot ROM.
  - Support “Load Optimized Default” functionality to backup customized setting in BIOS flash chip to prevent from CMOS battery failure.

- **System Memory**
  - Two 204-pin unbuffered DDR3 SO-DIMM sockets.
  - Up to 16GB DDR3 1600MHz memory.

- **Onboard Multi I/O**
  - Controller: Nuvoton NCT6627UD.
  - Serial ports: Three RS-232 ports, one RS-232/422/485 port and one TTL port.

- **USB Interface**
  - Ten USB ports with fuse protection, comply with USB Spec. Rev.2.0.
  - Four USB 3.0 ports.

- **Serial ATA**
  - Four SATA-600 with RAID 0, 1, and 10.

- **Display**
  - One 40-pin connector for 18/24-bit single/dual channel LVDS and one 8-pin inverter.
  - Two DisplayPorts.
  - Two DVI-D ports via a stacked DVI-D connector.

- **Ethernet**
  - LAN1 – Realtek RTL8111E Gigabit/Fast Ethernet.
  - LAN2 – Realtek RTL8111DP Gigabit/Fast Ethernet.

- **Audio**
  - Realtek High Definition audio codec ALC662.
  - Support 2.1 channel audio line-out as six terminal 3.50mm earphone jack.

- **Expansion Interface**
  - One PCI
  - One PCI-Express Mini Card socket which complies with PCI-Express Mini Card Spec. v1.2.
  - One SIM Card slot

- **Power Management**
  - ACPI (Advanced Configuration and Power Interface).

- **Watchdog Timer**
  - 1~255 seconds; up to 256 levels.

- **Form Factor**
  - 170 x 170mm Mini ITX form factor.

Note

All specifications and images are subject to change without notice.

1.3 Utilities Supported

- Chipset driver
- AHCI driver
- Ethernet driver
- Audio driver
- TPM driver

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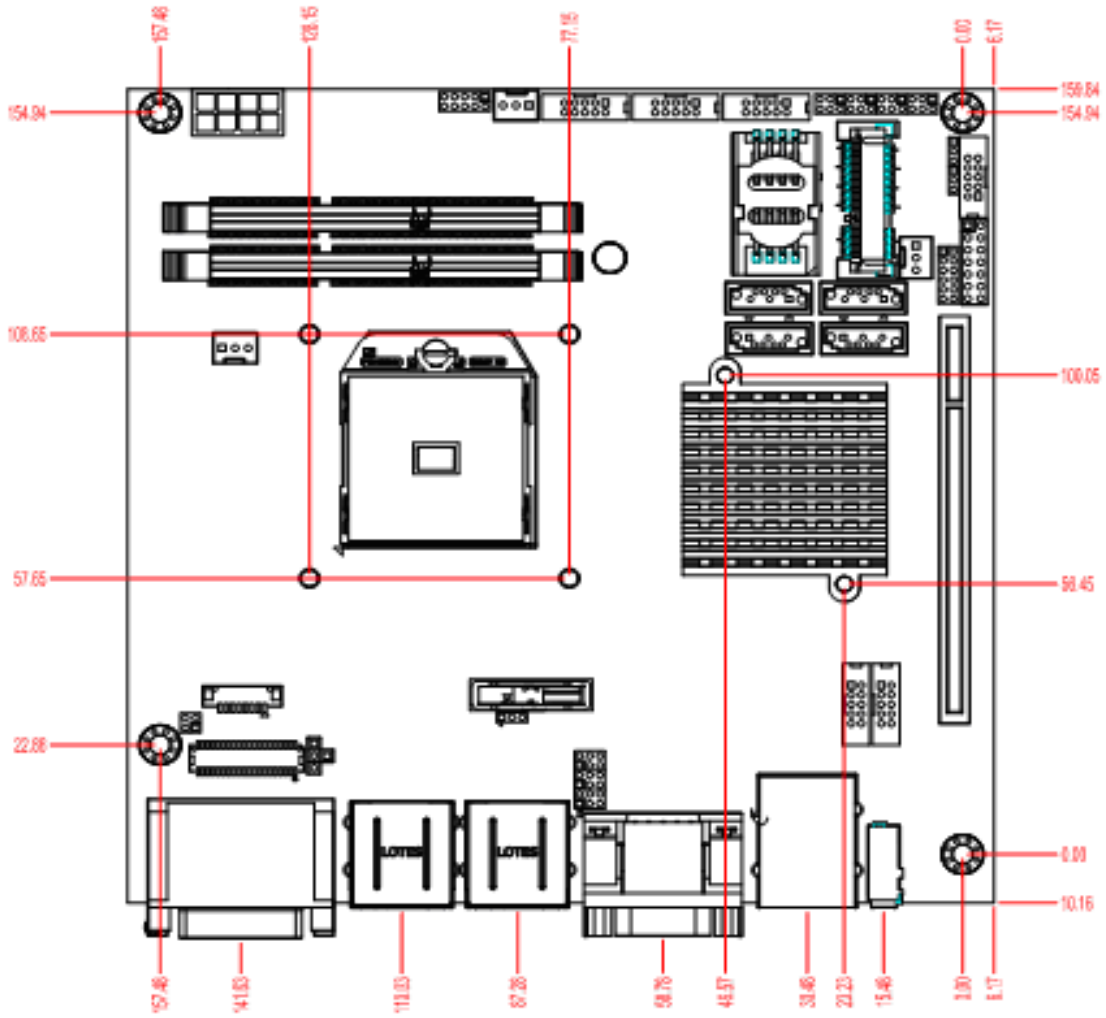
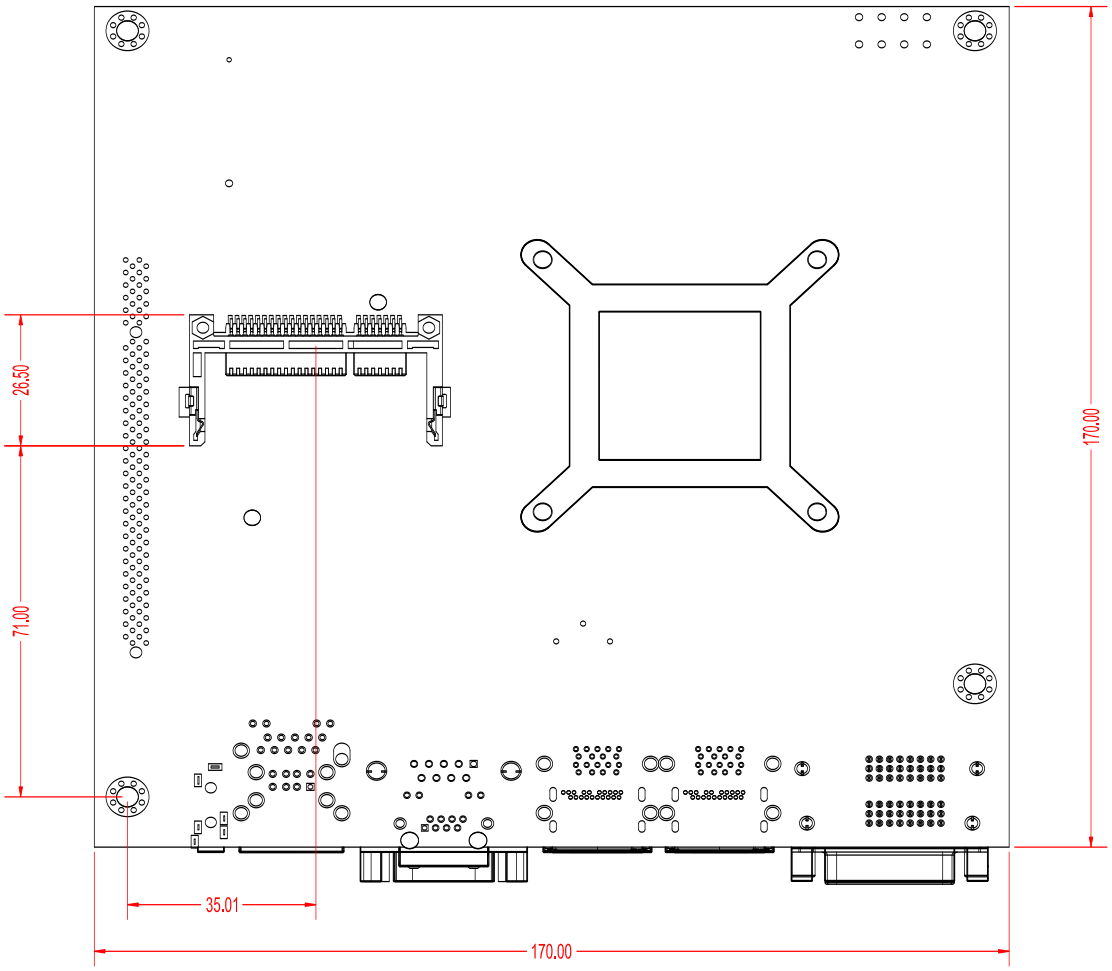
Chapter 2
Board and Pin Assignments

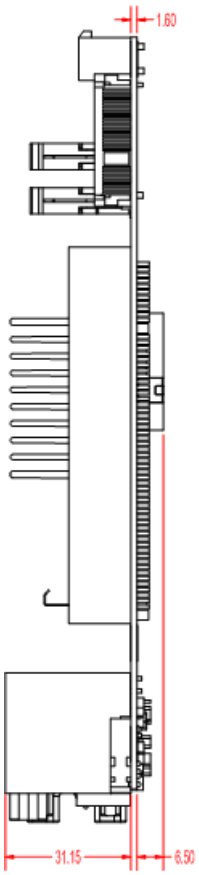
2.1 Board Dimensions and Fixing Holes



Top View

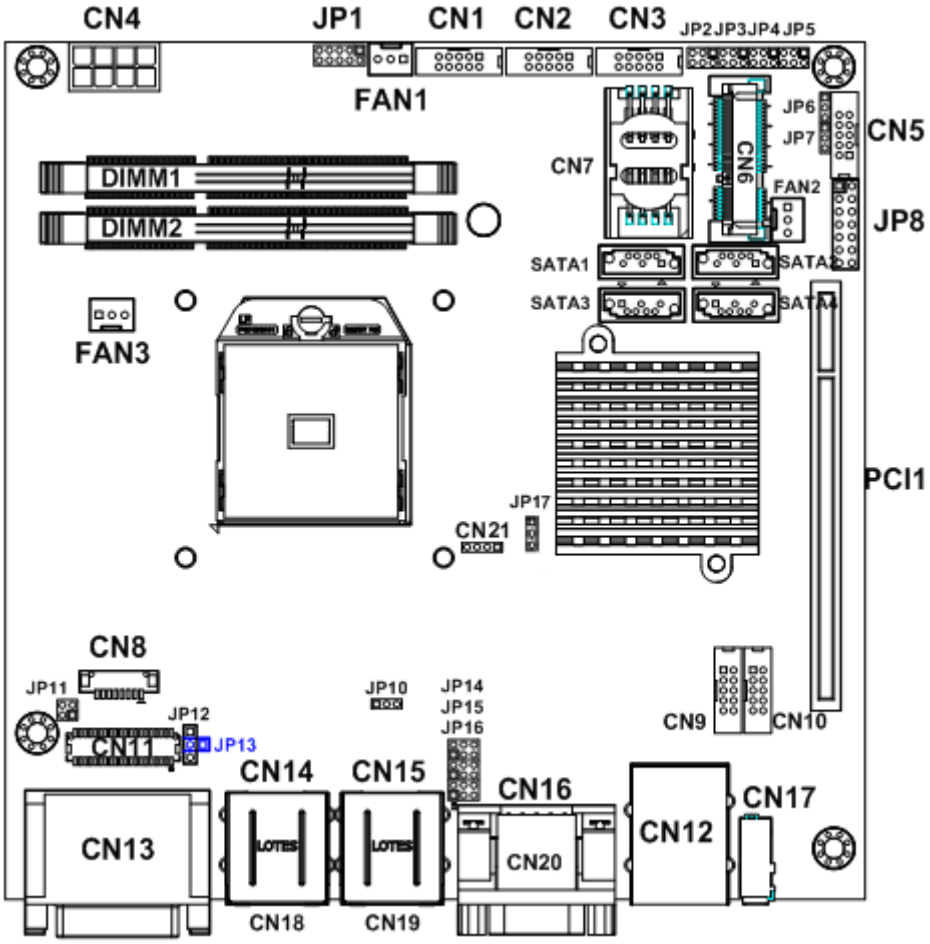


Bottom View

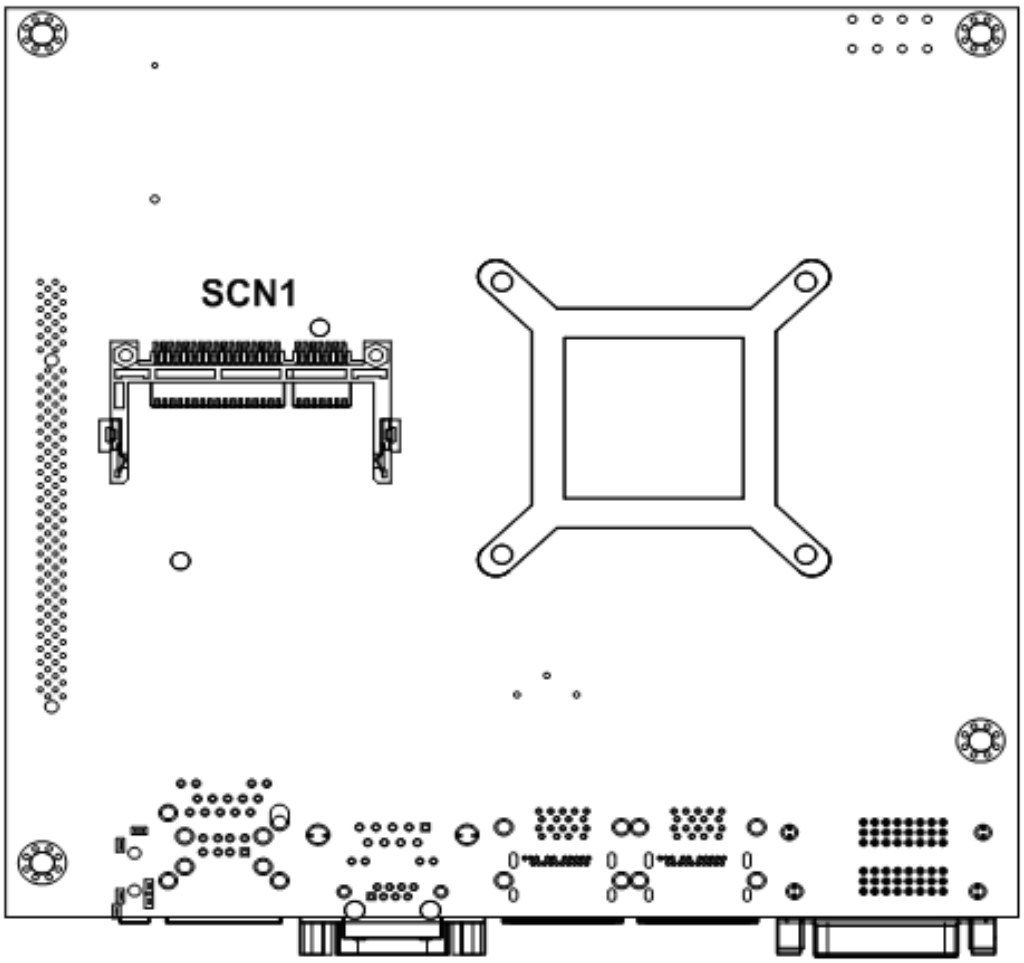


Side View

2.2 Board Layout



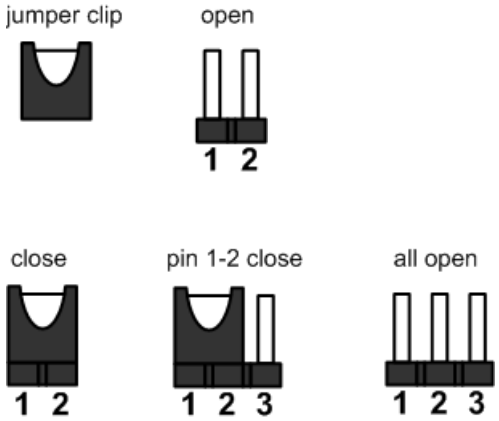
Top View



Bottom View

2.3 Jumper Settings

Jumper is a small component consisting of jumper clip and jumper pins. Install jumper clip on 2 jumper pins to close. And remove jumper clip from 2 jumper pins to open. The following illustration shows how to set up jumper.



Before applying power to MANO111 Series, please make sure all of the jumpers are in factory default position. Below you can find a summary table and onboard default settings.

Note

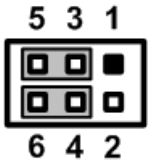
Once the default jumper setting needs to be changed, please do it under power-off condition.

Jumper	Description		Setting
JP2	COM4 Data/Power Selection Default: Default: RS-232 Data	CN3 Pin 1: DCD	3-5 close
		CN3 Pin 8: RI	4-6 close
JP3	COM3 Data/Power Selection Default: RS-232 Data	CN2 Pin 1: DCD	3-5 close
		CN2 Pin 8: RI	4-6 close
JP4	COM2 Data/Power Selection Default: RS-232 Data	CN1 Pin 1: DCD	3-5 close
		CN1 Pin 8: RI	4-6 close
JP5	COM1 Data/Power Selection Default: RS-232 Data	CN16 Pin 1: DCD	3-5 close
		CN16 Pin 9: RI	4-6 close
JP6	TPM Normal Operation/Special Commands Selection Default: Normal Operation		1-2 close
JP7	Auto Power On Default: Enable		1-2 close
JP10	Restore BIOS Optimal Defaults Default: Normal Operation		1-2 close
JP11	LVDS Brightness Control Mode Setting Default: PWM Mode		1-2 close
JP12	+3.3V/+5V LVDS Voltage Selection Default: +3.3V		1-2 close
JP13 (Optional)	+12V LVDS Voltage Selection		Open
JP14	COM1 RS-232/422/485 Mode Setting Default: RS-232		1-2 close
JP15			3-5, 4-6 close
JP16			3-5, 4-6 close
JP17	DASH enable(default)		1-2 close
	DASH disable		2-3 close

2.3.1 COM4 Data/Power Selection (JP2)

The COM4 port has +5V level power capability on DCD and +12V level on RI by setting this jumper.

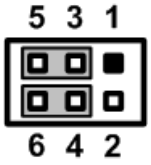
Function	Setting
Power: Set CN3 pin 1 to +5V level	1-3 close
Data: Set CN3 pin 1 to DCD (Default)	3-5 close
Power: Set CN3 pin 8 to +12V level	2-4 close
Data: Set CN3 pin 8 to RI (Default)	4-6 close



2.3.2 COM3 Data/Power Selection (JP3)

The COM3 port has +5V level power capability on DCD and +12V level on RI by setting this jumper.

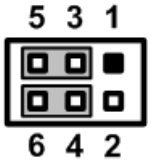
Function	Setting
Power: Set CN2 pin 1 to +5V level	1-3 close
Data: Set CN2 pin 1 to DCD (Default)	3-5 close
Power: Set CN2 pin 8 to +12V level	2-4 close
Data: Set CN2 pin 8 to RI (Default)	4-6 close



2.3.3 COM2 Data/Power Selection (JP4)

The COM2 port has +5V level power capability on DCD and +12V level on RI by setting this jumper.

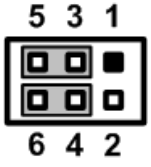
Function	Setting
Power: Set CN1 pin 1 to +5V level	1-3 close
Data: Set CN1 pin 1 to DCD (Default)	3-5 close
Power: Set CN1 pin 8 to +12V level	2-4 close
Data: Set CN1 pin 8 to RI (Default)	4-6 close



2.3.4 COM1 Data/Power Selection (JP5)

The COM1 port has +5V level power capability on DCD and +12V level on RI by setting this jumper. When COM1 is set to +5V or +12V level, please make sure the communication mode is RS-232 (see section 2.3.10).

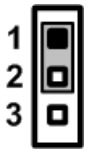
Function	Setting
Power: Set CN16 pin 1 to +5V level	1-3 close
Data: Set CN16 pin 1 to DCD (Default)	3-5 close
Power: Set CN16 pin 9 to +12V level	2-4 close
Data: Set CN16 pin 9 to RI (Default)	4-6 close



2.3.5 TPM Normal Operation/Special Commands Selection (JP6)

Use JP6 for TPM normal operation or special commands selection.

Function	Setting
Normal operation (Default)	1-2 close
Special Commands Enable	2-3 close



2.3.6 Auto Power On (JP7)

If JP7 is enabled for AC power input, the system will be automatically power on without pressing soft power button. If JP7 is disabled for AC power input, it is necessary to manually press soft power button to power on the system.

Function	Setting
Enable auto power on (Default)	1-2 close
Disable auto power on	2-3 close

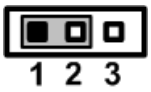
Note

This function is similar to the feature of power on after power failure, which is controlled by hardware circuitry instead of BIOS.

2.3.7 Restore BIOS Optimal Defaults (JP10)

Put jumper clip to pin 2-3 for a few seconds then move it back to pin 1-2. Doing this procedure can restore BIOS optimal defaults.

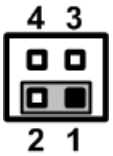
Function	Setting
Normal operation (Default)	1-2 close
Restore BIOS optimal defaults	2-3 close



2.3.8 LVDS Brightness Control Mode Setting (JP11)

The JP11 is enabled to select PWM or voltage control mode for inverter connector (CN8) pin 8. These two control modes are for adjusting LVDS brightness.

Function	Setting
PWM mode (Default)	1-2 close
Voltage mode	3-4 close

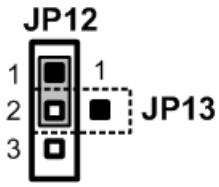


2.3.9 LVDS Voltage Selection (JP12 and JP13)

The board supports voltage selection for flat panel displays. Use JP12 to set LVDS connector (CN11) pin 1~6 VCCM to +3.3V or +5V voltage level. Use JP13 (optional) to set LVDS connector (CN11) pin 1~6 VCCM to +12V voltage level. To prevent hardware damage, before connecting please make sure that the input voltage of LVDS flat panel is correct.

Function	JP12 Setting
+3.3V level (Default)	1-2 close
+5V level	2-3 close

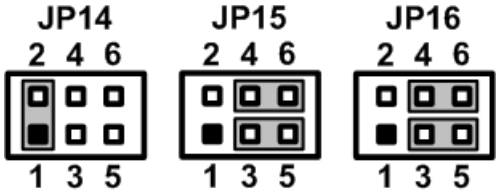
Function	JP13 Setting
+12V level (Optional)	1-2 close



2.3.10 COM1 RS-232/422/485 Mode Setting (JP14, JP15, JP16)

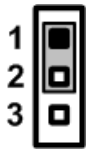
Use these jumpers to set COM1 port to operate as RS-232, RS-422 or RS-485 communication mode. When these jumpers are set to operate as RS-422 or RS-485 mode, please make sure COM1 is on data mode (see section 2.3.4)

Function	Setting
RS-232 mode (Default)	JP14 1-2 close JP15 3-5, 4-6 close JP16 3-5, 4-6 close
RS-422 mode	JP14 3-4 close JP15 1-3, 2-4 close JP16 1-3, 2-4 close
RS-485 mode	JP14 5-6 close JP15 1-3, 2-4 close JP16 1-3, 2-4 close



2.3.11 DASH Setting (JP17)

Function	Setting
DASH enable (Default)	1-2 close
DASH disable	2-3 close



2.4 Connectors

Signals go to other parts of the system through connectors. Loose or improper connection might cause problems, please make sure all connectors are properly and firmly connected. Here is a summary table which shows all connectors on the hardware.

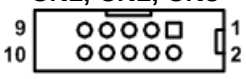
Connector	Description
CN1~3	COM2, COM3 and COM4 Connectors
CN4	Power Connector
CN5	COM5 Connector
CN6	PCI-Express Mini Card Connector
CN7	SIM Card Slot
CN8	Inverter Connector
CN9	USB 2.0 Wafer Port 8 and 9 Connector
CN10	USB 2.0 Wafer Port 6 and 7 Connector
CN11	LVDS Connector
CN12	LAN1, USB 2.0 Port 4 and 5 Connector
CN13	Dual DVI-D Connector
CN14~15	High Rise Stacked USB Connectors
CN16	High Rise D-Sub Connector
CN17	Six Terminal Earphone Jack
CN18~19	DisplayPort 1 and 2 Connectors
CN20	LAN2 Connector
CN21	RCC programming header
FAN1	Fan Connector
FAN2	System Fan Connector
FAN3	CPU Fan Connector
JP1	Digital I/O Connector
JP8	Front Panel Connector
SATA1	Serial ATA3 Connector
SATA2	Serial ATA1 Connector
SATA3	Serial ATA2 Connector
SATA4	Serial ATA0 Connector
SCN1	CFast™ Socket

2.4.1 COM Connectors (CN1, CN2, CN3 and CN5)

These CN1 (for COM2), CN2 (for COM3) and CN3 (for COM4) have +5V level power capability on DCD and 12V level on RI by setting JP4 and JP3 and JP2, respectively (see section 2.3.3 and 2.3.2 and 2.3.1). The pin assignments are listed in the following table.

Pin	CN1 Signal	Pin	CN1 Signal
1	DCD2	2	DSR2
3	RXD2	4	RTS2
5	TXD2	6	CTS2
7	DTR2	8	RI2
9	GND	10	N.C.

CN1, CN2, CN3



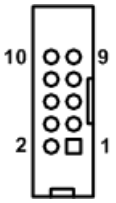
Pin	CN2 Signal	Pin	CN2 Signal
1	DCD3	2	DSR3
3	RXD3	4	RTS3
5	TXD3	6	CTS3
7	DTR3	8	RI3
9	GND	10	N.C.

Pin	CN3 Signal	Pin	CN3 Signal
1	DCD4	2	DSR4
3	RXD4	4	RTS4
5	TXD4	6	CTS4
7	DTR4	8	RI4
9	GND	10	N.C.

The CN5 (for COM5) is a 2x5 pin box header that supports RS-232 TTL signal.

Pin	CN5 Signal	Pin	CN5 Signal
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	N.C.

CN5

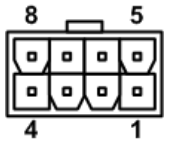


2.4.2 Power Connector (CN4)

Steady and sufficient power can be supplied to all components on the board by connecting power connector. Please make sure all components and devices are properly installed before connecting the power connector.

External power supply plug fits into this connector in only one orientation. Properly press down power supply plug until it completely and firmly fits into this connector. Loose connection may cause system instability.

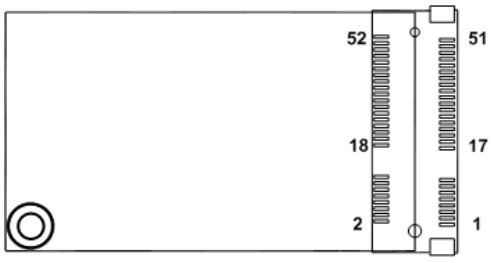
Pin	Signal	Pin	Signal
1	GND	5	+12V
2	GND	6	+12V
3	GND	7	+12V
4	GND	8	+12V



2.4.3 PCI-Express Mini Card Connector (CN6)

CN6 is a PCI-Express Mini Card connector which supports a PCI-Express x1 link and a USB 2.0 link. A PCI-Express Mini Card can be applied to either PCI-Express or USB 2.0. It complies with PCI-Express Mini Card Spec. v1.2.

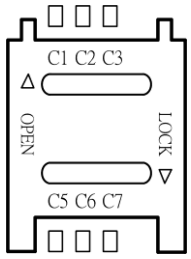
Pin	Signal	Pin	Signal
1	WAKE#	2	+3.3VSB
3	No use	4	GND
5	No use	6	+1.5V
7	CLKREQ#	8	No use
9	GND	10	No use
11	REFCLK-	12	No use
13	REFCLK+	14	No use
15	GND	16	No use
17	No use	18	GND
19	No use	20	W_DISABLE#
21	GND	22	PERST#
23	PE_RXN3	24	+3.3VSB
25	PE_RXP3	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PE_TXN3	32	SMB_DATA
33	PE_TXP3	34	GND
35	GND	36	USB_D8-
37	GND	38	USB_D8+
39	+3.3VSB	40	GND
41	+3.3VSB	42	LED_WWAN#
43	GND	44	LED_WLAN#
45	No use	46	LED_WPAN#
47	No use	48	+1.5V
49	No use	50	GND
51	No use	52	+3.3VSB



2.4.4 SIM Card Slot (CN7)

The CN7 is for inserting SIM Card. In order to work properly, the SIM Card must be used together with Mini Card which is inserted to socket CN6. It is mainly used in 3G wireless network application.

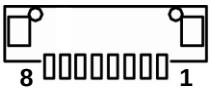
Pin	Signal
C1	PWR
C2	RST
C3	CLK
C5	GND
C6	VPP
C7	DATA



2.4.5 Inverter Connector (CN8)

The CN8 is a DF13-8S-1.25V 8-pin connector for inverter. We strongly recommend you to use the matching DF13-8S-1.25C connector to avoid malfunction.

Pin	Signal
1	VBL1 (+12V level)
2	VBL1 (+12V level)
3	VBL2 (+5V level)
4	VBL_ENABLE
5	GND
6	GND
7	GND
8	VBL Brightness Control



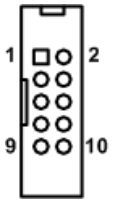
2.4.6 USB Connectors (CN9 and CN10)

These 2x5 pin wafers (CN9 and CN10) are Universal Serial Bus (USB) connectors. They are for installing versatile USB 2.0 compliant interface peripherals. These connectors are designed with +5V level standby power which can provide power when system is in suspend mode.

CN9 carries USB port 8 and 9 while CN10 carries USB port 6 and 7.

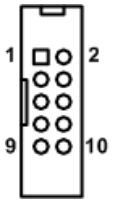
Pin	Signal	Pin	Signal
1	USB VCC (+5V level standby power)	2	USB VCC (+5V level standby power)
3	USB #8_D-	4	USB #9_D-
5	USB #8_D+	6	USB #9_D+
7	GND	8	GND
9	GND	10	GND

CN9



Pin	Signal	Pin	Signal
1	USB VCC (+5V level standby power)	2	USB VCC (+5V level standby power)
3	USB #6_D-	4	USB #7_D-
5	USB #6_D+	6	USB #7_D+
7	GND	8	GND
9	GND	10	GND

CN10



2.4.7 LVDS Connector (CN11)

This board has a 40-pin connector (CN11) for LVDS LCD interface. It is strongly recommended to use the matching JST SHDR-40VS-B 40-pin connector for LVDS interface. Pin 1~6 VCCM can be set to +3.3V level or +5V level by JP12 (see section 2.3.9).

18-bit single channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C.	8	N.C.
9	GND	10	GND
11	N.C.	12	N.C.
13	N.C.	14	N.C.
15	GND	16	GND
17	N.C.	18	N.C.
19	N.C.	20	N.C.
21	GND	22	GND
23	Channel A D0-	24	N.C.
25	Channel A D0+	26	N.C.
27	GND	28	GND
29	Channel A D1-	30	N.C.
31	Channel A D1+	32	N.C.
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

24-bit single channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C.	8	N.C.
9	GND	10	GND
11	N.C.	12	N.C.
13	N.C.	14	N.C.
15	GND	16	GND
17	N.C.	18	N.C.
19	N.C.	20	N.C.
21	GND	22	GND
23	Channel A D0-	24	N.C.
25	Channel A D0+	26	N.C.
27	GND	28	GND
29	Channel A D1-	30	Channel A D3-
31	Channel A D1+	32	Channel A D3+
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

18-bit dual channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C.	8	N.C.
9	GND	10	GND
11	N.C.	12	Channel B D0-
13	N.C.	14	Channel B D0+
15	GND	16	GND
17	Channel B CLK-	18	Channel B D1-
19	Channel B CLK+	20	Channel B D1+
21	GND	22	GND
23	Channel A D0-	24	Channel B D2-
25	Channel A D0+	26	Channel B D2+
27	GND	28	GND
29	Channel A D1-	30	N.C.
31	Channel A D1+	32	N.C.
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

24-bit dual channel

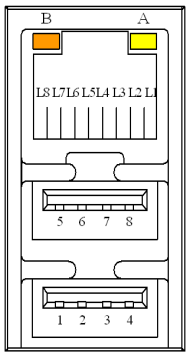
Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C.	8	N.C.
9	GND	10	GND
11	Channel B D3-	12	Channel B D0-
13	Channel B D3+	14	Channel B D0+
15	GND	16	GND
17	Channel B CLK-	18	Channel B D1-
19	Channel B CLK+	20	Channel B D1+
21	GND	22	GND
23	Channel A D0-	24	Channel B D2-
25	Channel A D0+	26	Channel B D2+
27	GND	28	GND
29	Channel A D1-	30	Channel A D3-
31	Channel A D1+	32	Channel A D3+
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

2.4.8 LAN and USB Connector (CN12)

The upper RJ-45 connector (for LAN1) is for high performance plug and play Gigabit ethernet interface which is fully compliant with the IEEE 802.3 standard. Connection can be established by plugging one end of the ethernet cable into this RJ-45 connector and the other end to a 1000/100/10-Base-T hub.

The lower stacked USB (compliant with USB 2.0 (480Mbps)) connector is for installing USB peripherals such as keyboard, mouse, scanner, etc. Note that this connector carries USB port 4 and 5.

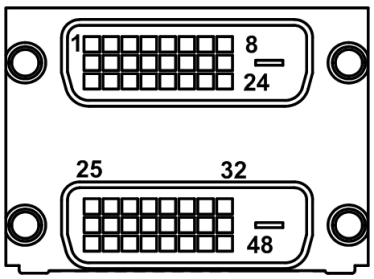
Pin	Signal	Pin	Signal
L1	MDI0+	1	USB_VCC (+5V level)
L2	MDI0-	2	USB #4_D-
L3	MDI1+	3	USB #4_D+
L4	MDI1-	4	GND
L5	MDI2+	5	USB VCC (+5V level)
L6	MDI2-	6	USB #5_D-
L7	MDI3+	7	USB #5_D+
L8	MDI3-	8	GND
A	Active LED (Yellow)		
B	100 LAN LED (Green) / 1000 LAN LED (Orange)		



2.4.9 Dual DVI-D Connector (CN13)

The CN13 is a dual DVI-D connector for digital visual interface display.

Pin	Signal	Pin	Signal
1	TMDS3_DATA2#	25	TMDS4_DATA2#
2	TMDS3_DATA2	26	TMDS4_DATA2
3	GND	27	GND
4	N.C.	28	N.C.
5	N.C.	29	N.C.
6	TMDS3_SCL	30	TMDS4_SCL
7	TMDS3_SDA	31	TMDS4_SDA
8	N.C.	32	N.C.
9	TMDS3_DATA1#	33	TMDS4_DATA1#
10	TMDS3_DATA1	34	TMDS4_DATA1
11	GND	35	GND
12	N.C.	36	N.C.
13	N.C.	37	N.C.
14	+5V	38	+5V
15	GND	39	GND
16	TMDS3_HDP	40	TMDS4_HDP
17	TMDS3_DATA0#	41	TMDS4_DATA0#
18	TMDS3_DATA0	42	TMDS4_DATA0
19	GND	43	GND
20	N.C.	44	N.C.
21	N.C.	45	N.C.
22	GND	46	GND
23	TMDS3_CLK	47	TMDS4_CLK
24	TMDS3_CLK#	48	TMDS4_CLK#

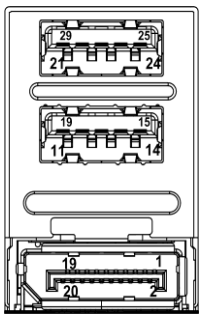


2.4.10 USB and DisplayPort Connectors (CN14~15 and CN18~19)

The CN14 is a high rise stacked USB connector carrying USB 3.0 (port 0 and 1) and USB 2.0 (port 10 and 11).

The lower DisplayPort 1 connector (CN18) supports DP++.

Pin	CN14 Signal	Pin	CN14 Signal
11	USB VCC (+5V level)	21	USB VCC (+5V level)
12	USB #10_D-	22	USB #11_D-
13	USB #10_D+	23	USB #11_D+
14	GND	24	GND
15	USB0_SSRXN	25	USB1_SSRXN
16	USB0_SSRXP	26	USB1_SSRXP
17	GND	27	GND
18	USB0_SSTXN	28	USB1_SSTXN
19	USB0_SSTXP	29	USB1_SSTXP



CN14

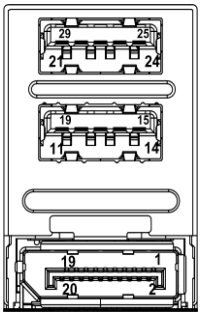
CN18

Pin	CN18 Signal	Pin	CN18 Signal
1	DP1_LANE0	11	GND
2	GND	12	DP1_LANE3#
3	DP1_LANE0#	13	Detect Pin
4	DP1_LANE1	14	GND
5	GND	15	DP1_AUX
6	DP1_LANE1#	16	GND
7	DP1_LANE2	17	DP1_AUX#
8	GND	18	DP1_HPDE
9	DP1_LANE2#	19	GND
10	DP1_LANE3	20	+3.3V

The CN15 is a high rise stacked USB connector carrying USB 3.0 (port 2 and 3) and USB 2.0 (port 12 and 3). Note that the CN15 can support USB2.0 keyboard/mouse in DOS, but don't plug in USB storage device when the system boot into OS.

The lower DisplayPort 2 connector (CN19) supports DP++.

Pin	CN15 Signal	Pin	CN15 Signal
11	USB VCC (+5V level standby power)	21	USB VCC (+5V level standby power)
12	USB #12_D-	22	USB #3_D-
13	USB #12_D+	23	USB #3_D+
14	GND	24	GND
15	USB2_SSRXN	25	USB3_SSRXN
16	USB2_SSRXP	26	USB3_SSRXP
17	GND	27	GND
18	USB2_SSTXN	28	USB3_SSTXN
19	USB2_SSTXP	29	USB3_SSTXP



CN15

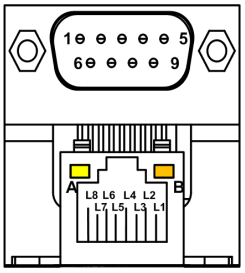
CN19

Pin	CN19 Signal	Pin	CN19 Signal
1	DP2_LANE0	11	GND
2	GND	12	DP2_LANE3#
3	DP2_LANE0#	13	Detect Pin
4	DP2_LANE1	14	GND
5	GND	15	DP2_AUX
6	DP2_LANE1#	16	GND
7	DP2_LANE2	17	DP2_AUX#
8	GND	18	DP2_HPDE
9	DP2_LANE2#	19	GND
10	DP2_LANE3	20	+3.3V

2.4.11 High Rise D-Sub and LAN Connectors (CN16 and CN20)

The CN16 is a high rise 9-pin D-Sub connector for COM1 featuring +5V level power capability on DCD and +12V level on RI by setting JP5 (see section 2.3.4). If you need COM1 port to support RS-422 or RS-485, please refer to section 2.3.10. The pin assignments of RS-232/RS-422/RS-485 are listed in table below.

Pin	RS-232	RS-422	RS-485
1	DCD	TX-	Data-
2	RXD	TX+	Data+
3	TXD	RX+	N.C
4	DTR	RX-	N.C.
5	GND	No use	No use
6	DSR	No use	No use
7	RTS	No use	No use
8	CTS	No use	No use
9	RI	No use	No use



The lower CN20 is a RJ-45 connector for LAN2 featuring high performance plug and play Gigabit ethernet interface which is fully compliant with the IEEE 802.3 standard. Connection can be established by plugging one end of the ethernet cable into this RJ-45 connector and the other end to a 1000/100/10-Base-T hub.

Pin	Signal	Pin	Signal
L1	MDI0+	L5	MDI2+
L2	MDI0-	L6	MDI2-
L3	MDI1+	L7	MDI3+
L4	MDI1-	L8	MDI3-
A	Active LED (Yellow)		
B	100 LAN LED (Green) / 1000 LAN LED (Orange)		

2.4.12 Six Terminal Earphone Jack (CN17)

The CN17 supports 2.1 channel audio line-out.

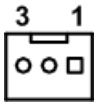
Pin	Signal
1	AUDIO_GND
2	LEF
3	Line out_L
4	LEF_SENSE
5	Line out_SENSE
6	Line out_R

2.4.13 FAN Connectors (FAN1, FAN2 and FAN3)

Fans are always needed for cooling down CPU and system temperature. The board has three fan connectors. You can find fan speed option(s) at BIOS Setup Utility if either fan is installed. For further information, see BIOS Setup Utility: Advanced\HW Monitor\PC Health Status.

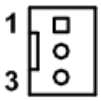
System fan interface is available through FAN1, see table below.

Pin	Signal
1	GND
2	+12V level
3	Fan speed feedback



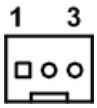
The FAN2 is a standard 3-pin 2.54mm fan connector.

Pin	Signal
1	GND
2	+12V level
3	Fan speed feedback



CPU fan interface is available through FAN3, see table below.

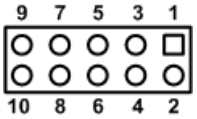
Pin	Signal
1	GND
2	+12V level
3	Fan speed feedback



2.4.14 Digital I/O Connector (JP1)

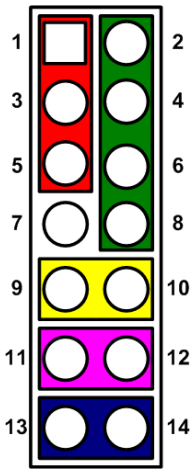
The board is equipped with an 8-channel (4 inputs and 4 outputs) digital I/O connector that meets requirements for a system customary automation control. The digital I/O can be configured to control cash drawers and sense warning signals from an Uninterrupted Power System (UPS), or perform store security control. You may use software programming to control these digital signals. The software application method is provided in Appendix B.

Pin	Signal	Pin	Signal
1	Digital Input 0	2	Digital Output 0
3	Digital Input 1	4	Digital Output 1
5	Digital Input 2	6	Digital Output 2
7	Digital Input 3	8	Digital Output 3
9	GND	10	GND



2.4.15 Front Panel Connector (JP8)

Pin	Signal
1	PWRLED+
2	EXT SPK-
3	N.C.
4	Buzzer
5	PWRLED-
6	N.C.
7	N.C.
8	EXT SPK+
9	PWRSW-
10	PWRSW+
11	HW RST-
12	HW RST+
13	HDDLED-
14	HDDLED+



Power LED
Pin 1 connects anode(+) of LED and pin 5 connects cathode(-) of LED. The power LED lights up when the system is powered on. The pin 3 is defined as GND.

External Speaker and Internal Buzzer
Pin 2, 4, 6 and 8 connect the case-mounted speaker unit or internal buzzer. While connecting the CPU board to an internal buzzer, please set pin 2 and 4 closed; while connecting to an external speaker, you need to set pins 2 and 4 opened and connect the speaker cable to pin 8(+) and pin 2(-).

Power On/Off Button
Pin 9 and 10 connect the power button on front panel to the CPU board, which allows users to turn on or off power supply.

System Reset Switch
Pin 11 and 12 connect the case-mounted reset switch that reboots your computer without turning off the power switch. It is a better way to reboot your system for a longer life of system power supply.

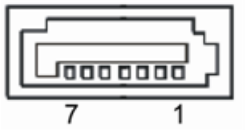
HDD Activity LED
This connection is linked to hard drive activity LED on the control panel. LED flashes when HDD is being accessed. Pin 13 and 14 connect the hard disk drive to the front panel HDD LED, pin 13 is assigned as cathode(-) and pin 14 is assigned as anode(+).

2.4.16 Serial ATA Connectors (SATA1, SATA2, SATA3 and SATA4)

These Serial Advanced Technology Attachment (Serial ATA or SATA) connectors are for high-speed SATA interfaces. They are computer bus interfaces for connecting to devices such as hard disk drives.

This board has four SATA 3.0 ports featuring 6Gb/s performance.

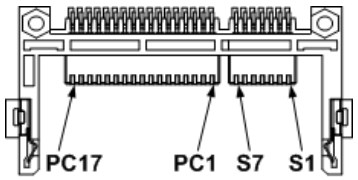
Pin	Signal
1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA_RX+
7	GND



2.4.17 CFast™ Socket (SCN1)

The board is equipped with a CFast™ socket on the bottom side to support CFast™ card which is based on Serial ATA bus. This socket is specially designed to avoid incorrect installation of CFast™ card. When installing or removing CFast™ card, please make sure the system power is off. The CFast™ card by default identifies itself as C: or D: drive in your PC system.

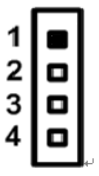
Pin	Signal	Pin	Signal
S1	GND	PC1	N.C
S2	TX+	PC2	GND
S3	TX-	PC3	N.C
S4	GND	PC4	N.C
S5	RX-	PC5	N.C
S6	RX+	PC6	N.C
S7	GND	PC7	GND
		PC8	N.C
		PC9	N.C
		PC10	N.C
		PC11	N.C
		PC12	N.C
		PC13	+3.3V level
		PC14	+3.3V level
		PC15	GND
		PC16	GND
		PC17	N.C



2.4.17 RCC Programing Header (CN21)

RCC is a Remote Control controller for DASH supported. This Header is used for updating RCC Firmware via SWIM interface.

Pin	Signal
1	VCC
2	SWIM
3	GND
4	RST



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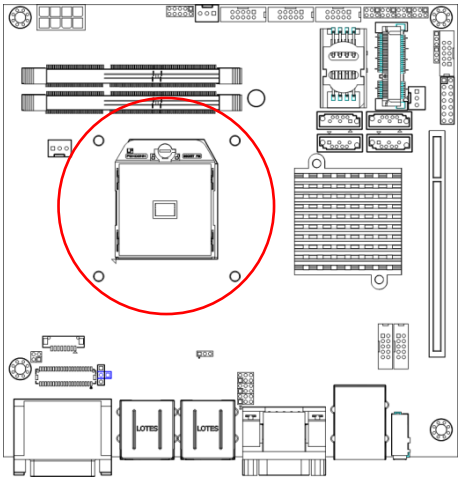
Chapter 3
Hardware Installation

3.1 Installing the Processor

Please install the processor step by step as below:

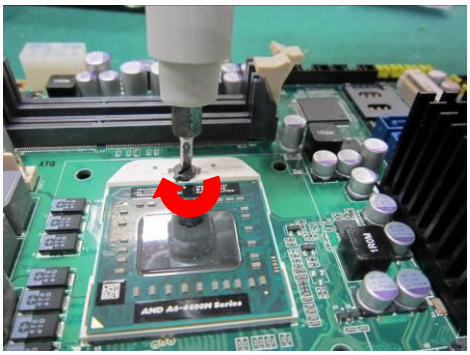
1. Locate the processor socket on the board.



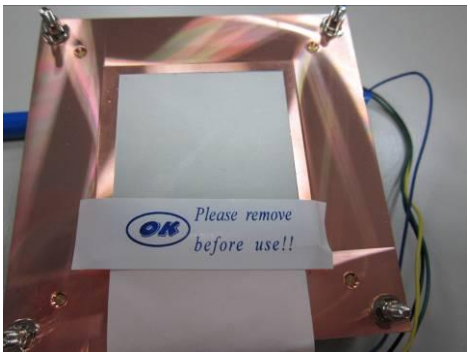
2. Grasp the processor carefully by the edges and place it into the socket vertically. Please ensure that the processor is oriented correctly (see image below).

Caution ***The processor fits in only one correct orientation. DO NOT force the processor into the socket to prevent bending the landing pins in the socket and damaging the processor!***

3. Turn the processor lock into the correct locking orientation as illustrated below.



4. Remove protective cover from the heatsink.



5. Make sure the CPU fan cable is plugged to CPU fan connector.

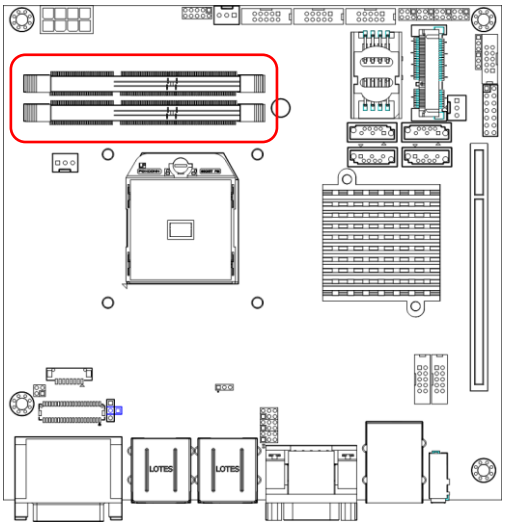
6. Place heatsink and CPU fan assembly on top of the installed processor. Match the four screws to the fixing holes on the board. Then screw tightly the heatsink and CPU fan assembly onto the board.

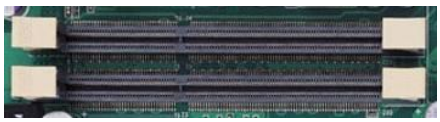
Caution

Be careful not to over tighten the screws as it can damage the processor or the motherboard.

3.2 Installing the Memory

The board comes with two 204-pin DDR3 SO-DIMM memory sockets with maximum memory capacity up to 16GB. The following image illustrates the location of the sockets:





DIMM1

DIMM2

Note

A DDR3 module has the same physical dimensions as a DDR2 SO-DIMM but is notched differently to prevent installation on a DDR2 SO-DIMM socket.

Please follow steps below to install the memory modules:

- Push down latches on each side of the SO-DIMM socket.
- Align the memory module with the socket that notches of memory module must match the socket keys for a correct installation.
- Install the memory module into the socket and push it firmly down until it is fully seated. The socket latches are levered upwards and clipped on to the edges of the SO-DIMM.
- Install any remaining SO-DIMM modules.

Chapter 4
Hardware Description

4.1 APU (Accelerated Processing Unit)

The MANO111 Series supports AMD R-Series APU (Accelerated Processing Unit), which enables your system to operate under Windows® XP, Windows® 7 and Linux environments. The system performance depends on the APU.

4.2 BIOS

The MANO111 Series uses AMI Plug and Play BIOS with a single 32Mbit SPI Flash.

4.3 System Memory

The MANO111 Series supports two 204-pin DDR3 SO-DIMM sockets for a maximum memory of 16GB DDR3 SDRAMs. The memory module comes in sizes of 1GB, 2GB and 4GB.

4.4 I/O Port Address Map

The AMD G-Series APU communicates via I/O ports. Total 1KB port addresses are available for assigning to other devices via I/O expansion cards.

Input/output (IO)

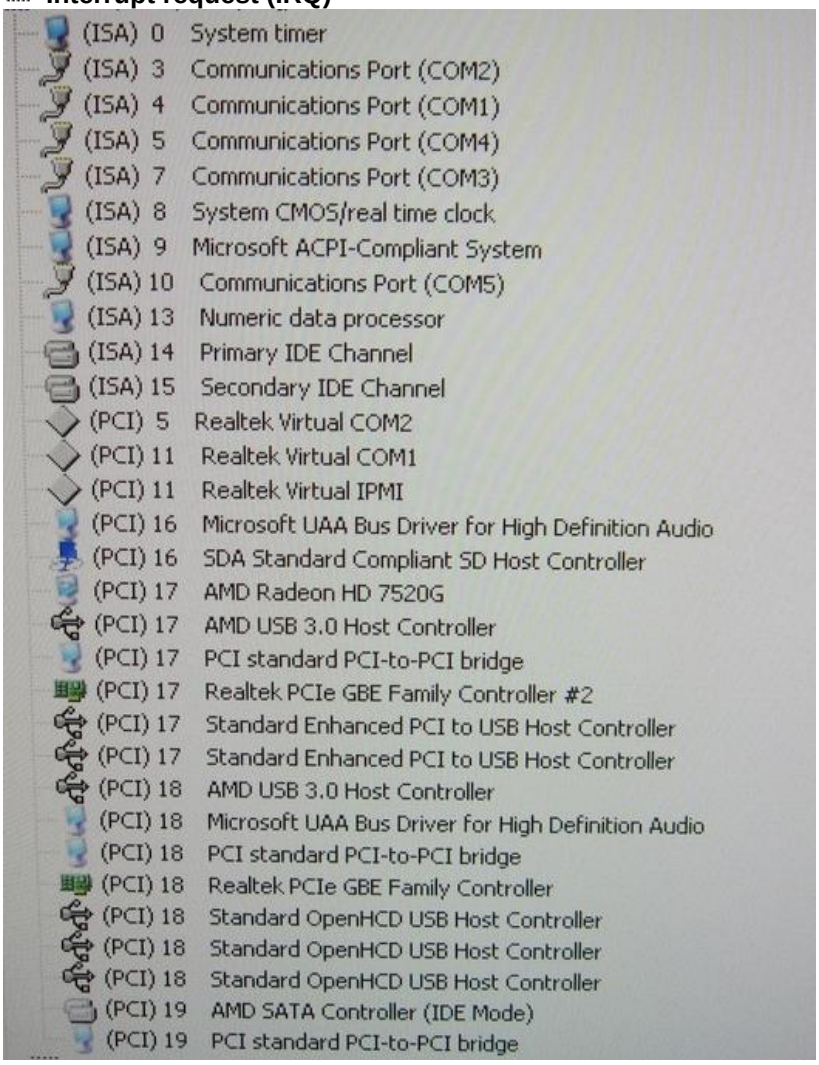
- [00000000 – 0000000F] Direct memory access controller
- [00000000 – 0000000F] Motherboard resources
- [00000000 – 000003AF] PCI bus
- [00000010 – 0000001F] Motherboard resources
- [00000010 – 0000001F] Motherboard resources
- [00000020 – 00000021] Programmable interrupt controller
- [00000022 – 0000003F] Motherboard resources
- [00000022 – 0000003F] Motherboard resources
- [00000040 – 00000043] System timer
- [00000044 – 0000005F] Motherboard resources
- [00000061 – 00000061] System speaker
- [00000063 – 00000063] Motherboard resources
- [00000065 – 00000065] Motherboard resources
- [00000067 – 0000006F] Motherboard resources
- [00000070 – 00000071] System CMOS/real time clock
- [00000072 – 0000007F] Motherboard resources
- [00000072 – 0000007F] Motherboard resources
- [00000080 – 00000080] Motherboard resources
- [00000080 – 00000080] Motherboard resources
- [00000081 – 00000083] Direct memory access controller
- [00000084 – 00000086] Motherboard resources
- [00000084 – 00000086] Motherboard resources
- [00000087 – 00000087] Direct memory access controller
- [00000088 – 00000088] Motherboard resources
- [00000088 – 00000088] Motherboard resources
- [00000089 – 0000008B] Direct memory access controller
- [0000008C – 0000008E] Motherboard resources
- [0000008C – 0000008E] Motherboard resources
- [0000008F – 0000008F] Direct memory access controller
- [00000090 – 0000009F] Motherboard resources
- [00000090 – 0000009F] Motherboard resources
- [000000A0 – 000000A1] Programmable interrupt controller
- [000000A2 – 000000BF] Motherboard resources
- [000000A2 – 000000BF] Motherboard resources
- [000000B1 – 000000B1] Motherboard resources
- [000000C0 – 000000DF] Direct memory access controller
- [000000E0 – 000000EF] Motherboard resources
- [000000E0 – 000000EF] Motherboard resources
- [000000F0 – 000000FF] Numeric data processor
- [00000170 – 00000177] Secondary IDE Channel
- [000001F0 – 000001F7] Primary IDE Channel
- [00000274 – 00000277] ISAPNP Read Data Port
- [00000279 – 00000279] ISAPNP Read Data Port
- [00000290 – 00000297] Motherboard resources
- [000002E0 – 000002E7] Communications Port (COM5)

- [000002F8 – 000002FF] Communications Port (COM2)
- [00000376 – 00000376] Secondary IDE Channel
- [000003B0 – 000003BB] AMD Radeon HD 7520G
- [000003B0 – 000003DF] PCI bus
- [000003C0 – 000003DF] AMD Radeon HD 7520G
- [000003E0 – 00000CF7] PCI bus
- [000003E8 – 000003EF] Communications Port (COM3)
- [000003F6 – 000003F6] Primary IDE Channel
- [000003F8 – 000003FF] Communications Port (COM1)
- [0000040B – 0000040B] Motherboard resources
- [000004D0 – 000004D1] Motherboard resources
- [000004D0 – 000004D1] Motherboard resources
- [000004D6 – 000004D6] Motherboard resources
- [00000800 – 0000089F] Motherboard resources
- [00000900 – 0000090F] Motherboard resources
- [00000910 – 0000091F] Motherboard resources
- [00000A79 – 00000A79] ISAPNP Read Data Port
- [00000B20 – 00000B3F] Motherboard resources
- [00000C00 – 00000C01] Motherboard resources
- [00000C14 – 00000C14] Motherboard resources
- [00000C50 – 00000C51] Motherboard resources
- [00000C52 – 00000C52] Motherboard resources
- [00000C6C – 00000C6C] Motherboard resources
- [00000C6F – 00000C6F] Motherboard resources
- [00000CD0 – 00000CD1] Motherboard resources
- [00000CD2 – 00000CD3] Motherboard resources
- [00000CD4 – 00000CD5] Motherboard resources
- [00000CD6 – 00000CD7] Motherboard resources
- [00000CD8 – 00000CDF] Motherboard resources
- [00000D00 – 0000FFFF] PCI bus
- [0000D000 – 0000D0FF] Realtek Virtual IPMI
- [0000D000 – 0000DFFF] PCI standard PCI-to-PCI bridge
- [0000D100 – 0000D1FF] Realtek Virtual COM2
- [0000D200 – 0000D2FF] Realtek Virtual COM1
- [0000D300 – 0000D3FF] Realtek PCIe GBE Family Controller
- [0000E000 – 0000E0FF] Realtek PCIe GBE Family Controller #2
- [0000E000 – 0000EFFF] PCI standard PCI-to-PCI bridge
- [0000F000 – 0000F0FF] AMD Radeon HD 7520G
- [0000F100 – 0000F10F] AMD PCI IDE Controller
- [0000F150 – 0000F15F] AMD SATA Controller (IDE Mode)
- [0000F160 – 0000F163] AMD SATA Controller (IDE Mode)
- [0000F170 – 0000F177] AMD SATA Controller (IDE Mode)
- [0000F180 – 0000F183] AMD SATA Controller (IDE Mode)
- [0000F190 – 0000F197] AMD SATA Controller (IDE Mode)
- [0000FE00 – 0000FEFE] Motherboard resources

4.5 Interrupt Controller (IRQ) Map

The interrupt controller (IRQ) mapping list is shown as follows:

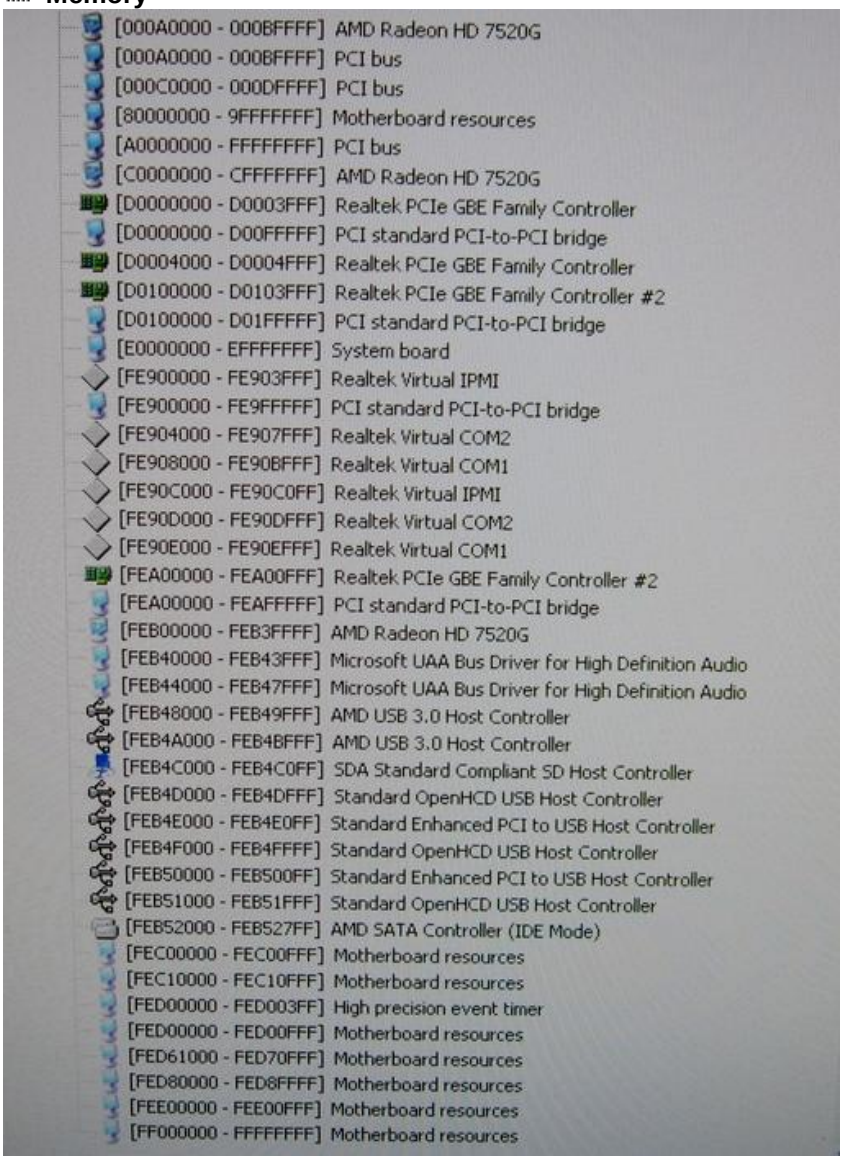
Interrupt request (IRQ)


(ISA) 0 System timer
(ISA) 3 Communications Port (COM2)
(ISA) 4 Communications Port (COM1)
(ISA) 5 Communications Port (COM4)
(ISA) 7 Communications Port (COM3)
(ISA) 8 System CMOS/real time clock
(ISA) 9 Microsoft ACPI-Compliant System
(ISA) 10 Communications Port (COM5)
(ISA) 13 Numeric data processor
(ISA) 14 Primary IDE Channel
(ISA) 15 Secondary IDE Channel
(PCI) 5 Realtek Virtual COM2
(PCI) 11 Realtek Virtual COM1
(PCI) 11 Realtek Virtual IPMI
(PCI) 16 Microsoft UAA Bus Driver for High Definition Audio
(PCI) 16 SDA Standard Compliant SD Host Controller
(PCI) 17 AMD Radeon HD 7520G
(PCI) 17 AMD USB 3.0 Host Controller
(PCI) 17 PCI standard PCI-to-PCI bridge
(PCI) 17 Realtek PCIe GBE Family Controller #2
(PCI) 17 Standard Enhanced PCI to USB Host Controller
(PCI) 17 Standard Enhanced PCI to USB Host Controller
(PCI) 18 AMD USB 3.0 Host Controller
(PCI) 18 Microsoft UAA Bus Driver for High Definition Audio
(PCI) 18 PCI standard PCI-to-PCI bridge
(PCI) 18 Realtek PCIe GBE Family Controller
(PCI) 18 Standard OpenHCD USB Host Controller
(PCI) 18 Standard OpenHCD USB Host Controller
(PCI) 18 Standard OpenHCD USB Host Controller
(PCI) 19 AMD SATA Controller (IDE Mode)
(PCI) 19 PCI standard PCI-to-PCI bridge

4.6 Memory Map

The memory mapping list is shown as follows:

Memory


[000A0000 - 000BFFFF] AMD Radeon HD 7520G
[000A0000 - 000BFFFF] PCI bus
[000C0000 - 000DFFFF] PCI bus
[80000000 - 9FFFFFFF] Motherboard resources
[A0000000 - FFFFFFFF] PCI bus
[C0000000 - CFFFFFFF] AMD Radeon HD 7520G
[D0000000 - D0003FFF] Realtek PCIe GBE Family Controller
[D0000000 - D00FFFFF] PCI standard PCI-to-PCI bridge
[D0004000 - D0004FFF] Realtek PCIe GBE Family Controller
[D0100000 - D0103FFF] Realtek PCIe GBE Family Controller #2
[D0100000 - D01FFFFF] PCI standard PCI-to-PCI bridge
[E0000000 - EFFFFFFF] System board
[FE900000 - FE903FFF] Realtek Virtual IPMI
[FE900000 - FE9FFFFF] PCI standard PCI-to-PCI bridge
[FE904000 - FE907FFF] Realtek Virtual COM2
[FE908000 - FE90BFFF] Realtek Virtual COM1
[FE90C000 - FE90C0FF] Realtek Virtual IPMI
[FE90D000 - FE90DFFF] Realtek Virtual COM2
[FE90E000 - FE90EFFF] Realtek Virtual COM1
[FEA00000 - FEA00FFF] Realtek PCIe GBE Family Controller #2
[FEA00000 - FEAFFFFF] PCI standard PCI-to-PCI bridge
[FEB00000 - FEB3FFFF] AMD Radeon HD 7520G
[FEB40000 - FEB43FFF] Microsoft UAA Bus Driver for High Definition Audio
[FEB44000 - FEB47FFF] Microsoft UAA Bus Driver for High Definition Audio
[FEB48000 - FEB49FFF] AMD USB 3.0 Host Controller
[FEB4A000 - FEB4BFFF] AMD USB 3.0 Host Controller
[FEB4C000 - FEB4C0FF] SDA Standard Compliant SD Host Controller
[FEB4D000 - FEB4DFFF] Standard OpenHCD USB Host Controller
[FEB4E000 - FEB4E0FF] Standard Enhanced PCI to USB Host Controller
[FEB4F000 - FEB4FFFF] Standard OpenHCD USB Host Controller
[FEB50000 - FEB500FF] Standard Enhanced PCI to USB Host Controller
[FEB51000 - FEB51FFF] Standard OpenHCD USB Host Controller
[FEB52000 - FEB527FF] AMD SATA Controller (IDE Mode)
[FEC00000 - FEC00FFF] Motherboard resources
[FEC10000 - FEC10FFF] Motherboard resources
[FED00000 - FED003FF] High precision event timer
[FED00000 - FED00FFF] Motherboard resources
[FED61000 - FED70FFF] Motherboard resources
[FED80000 - FED8FFFF] Motherboard resources
[FEE00000 - FEE00FFF] Motherboard resources
[FF000000 - FFFFFFFF] Motherboard resources

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Chapter 5
AMI BIOS Setup Utility

The AMI UEFI BIOS provides users with a built-in setup program to modify basic system configuration. All configured parameters are stored in a flash chip to save the setup information whenever the power is turned off. This chapter provides users with detailed description about how to set up basic system configuration through the AMI BIOS setup utility.

5.1 Starting

To enter the setup screens, follow the steps below:

1. Turn on the computer and press the <Del> key immediately.
2. After you press the <Del> key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as the Advanced and Chipset menus.

Note

If your computer can not boot after making and saving system changes with Setup, you can restore BIOS optimal defaults by setting JP10 (see section 2.3.7).

It is strongly recommended that you should avoid changing the chipset's defaults. Both AMI and your system manufacturer have carefully set up these defaults that provide the best performance and reliability.

5.2 Navigation Keys

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include <F1>, <F2>, <Enter>, <ESC>, <Arrow> keys, and so on.

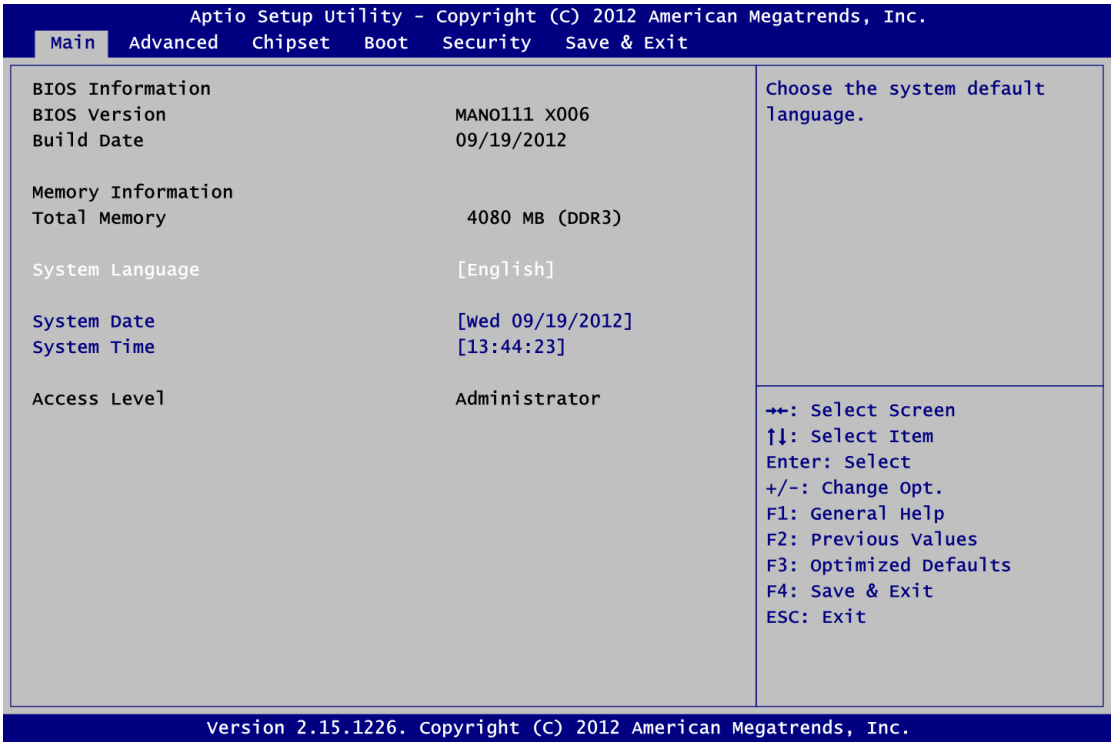
Note

Some of the navigation keys differ from one screen to another.

Hot Keys	Description
→← Left/Right	The Left and Right <Arrow> keys allow you to select a setup screen.
↑↓ Up/Down	The Up and Down <Arrow> keys allow you to select a setup screen or sub-screen.
+– Plus/Minus	The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item.
Tab	The <Tab> key allows you to select setup fields.
F1	The <F1> key allows you to display the General Help screen.
F2	The <F2> key allows you to Load Previous Values.
F3	The <F3> key allows you to Load Optimized Defaults.
F4	The <F4> key allows you to save any changes you have made and exit Setup. Press the <F4> key to save your changes.
Esc	The <Esc> key allows you to discard any changes you have made and exit the Setup. Press the <Esc> key to exit the setup without saving your changes.
Enter	The <Enter> key allows you to display or change the setup option listed for a particular setup item. The <Enter> key can also allow you to display the setup sub- screens.

5.3 Main Menu

When you first enter the setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. System Time/Date can be set up as described below. The Main BIOS setup screen is shown below.



System Language
Use this item to choose the system default language.

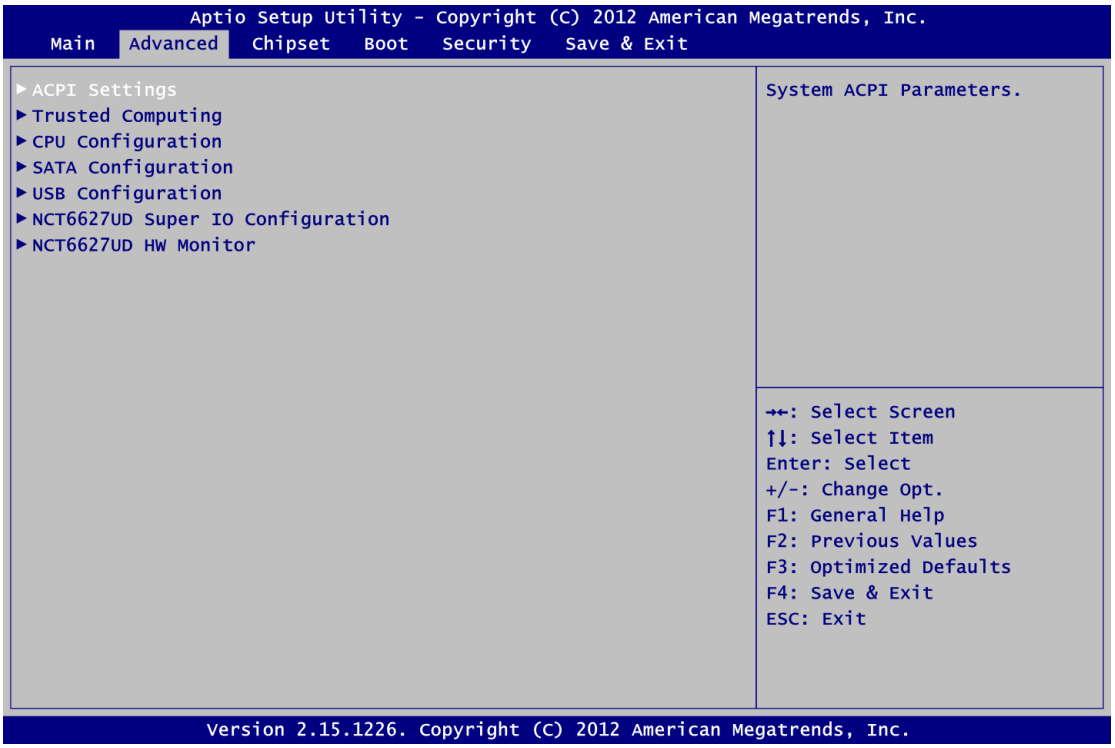
System Date/Time
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

5.4 Advanced Menu

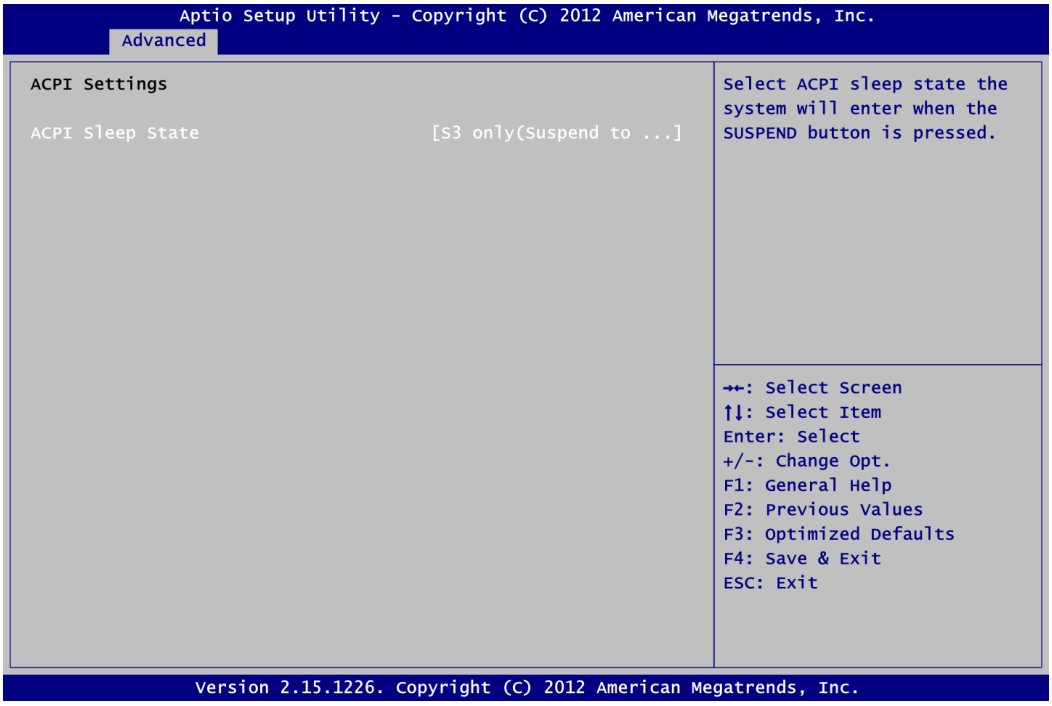
The Advanced menu also allows users to set configuration of the CPU and other system devices. You can select any of the items in the left frame of the screen to go to the sub menus:

- ▶ ACPI Settings
- ▶ Trusted Computing
- ▶ CPU Configuration
- ▶ SATA Configuration
- ▶ USB Configuration
- ▶ NCT6627UD Super IO Configuration
- ▶ NCT6627UD HW Monitor

For items marked with "▶", please press <Enter> for more options.

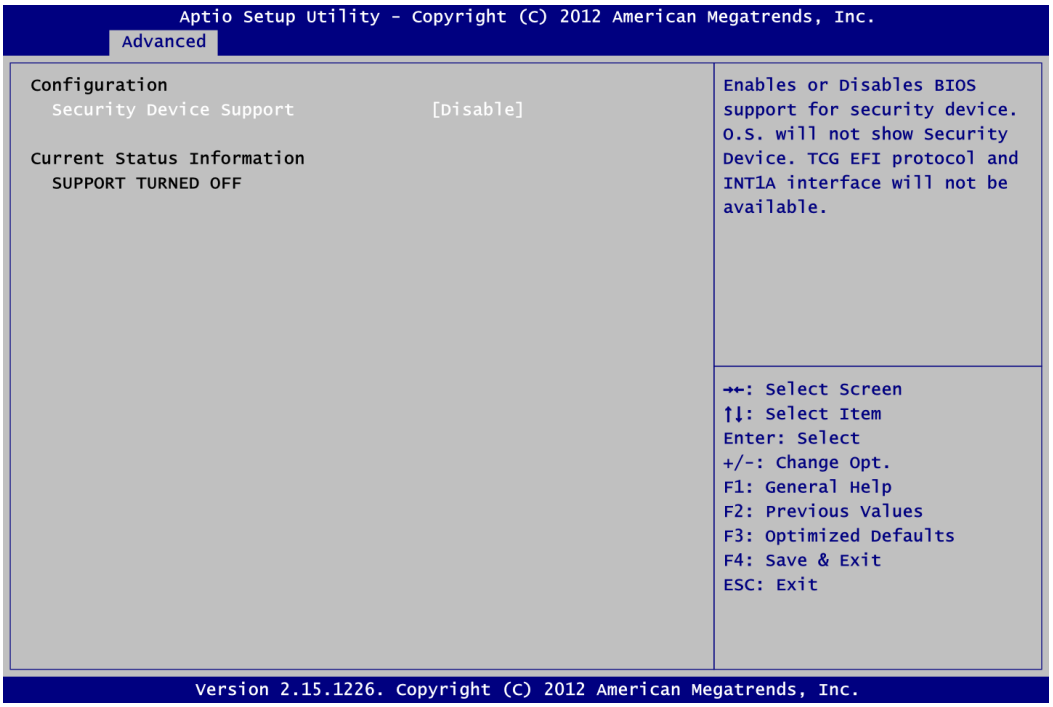


- **ACPI Settings**
  You can use this screen to select options for the ACPI configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
ACPI Settings
ACPI Sleep State
[S3 only(Suspend to ...]
Select ACPI sleep state the system will enter when the SUSPEND button is pressed.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.

ACPI Sleep State
Select the highest ACPI sleep state the system will enter when the suspend button is pressed. Configuration options are Suspend Disabled and S3 only (Suspend to RAM).

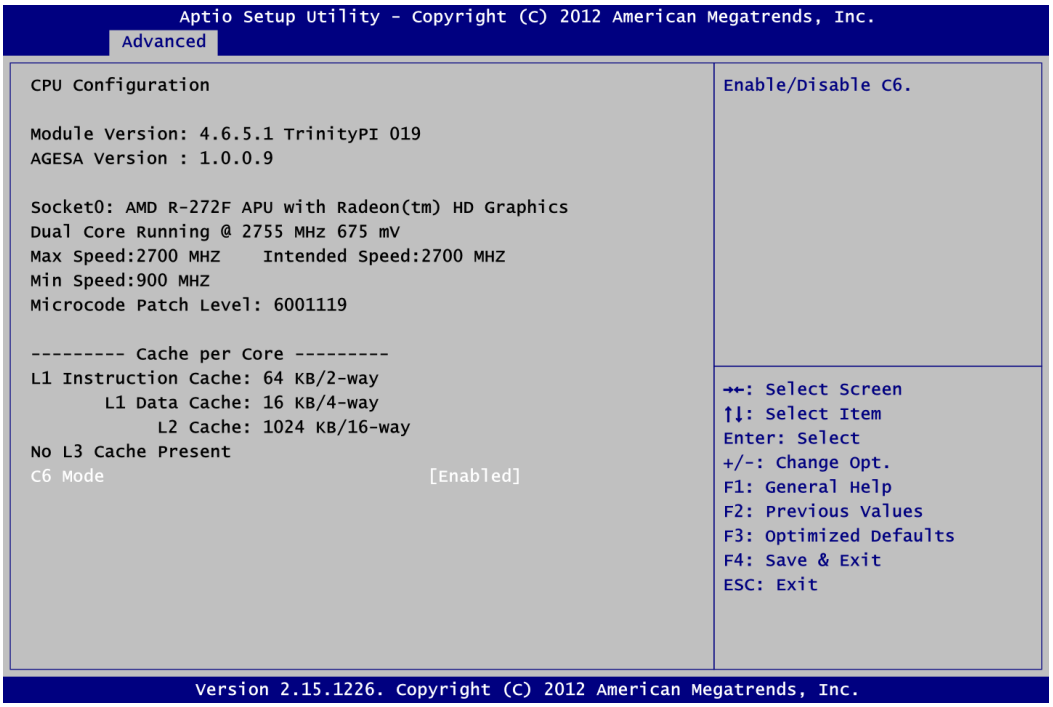
- **Trusted Computing**
  This screen provides function for specifying the TPM settings.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
Configuration
Security Device Support [Disable]
Current Status Information
SUPPORT TURNED OFF
Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.

Security Device Support
Use this item to enable or disable BIOS support for security device.

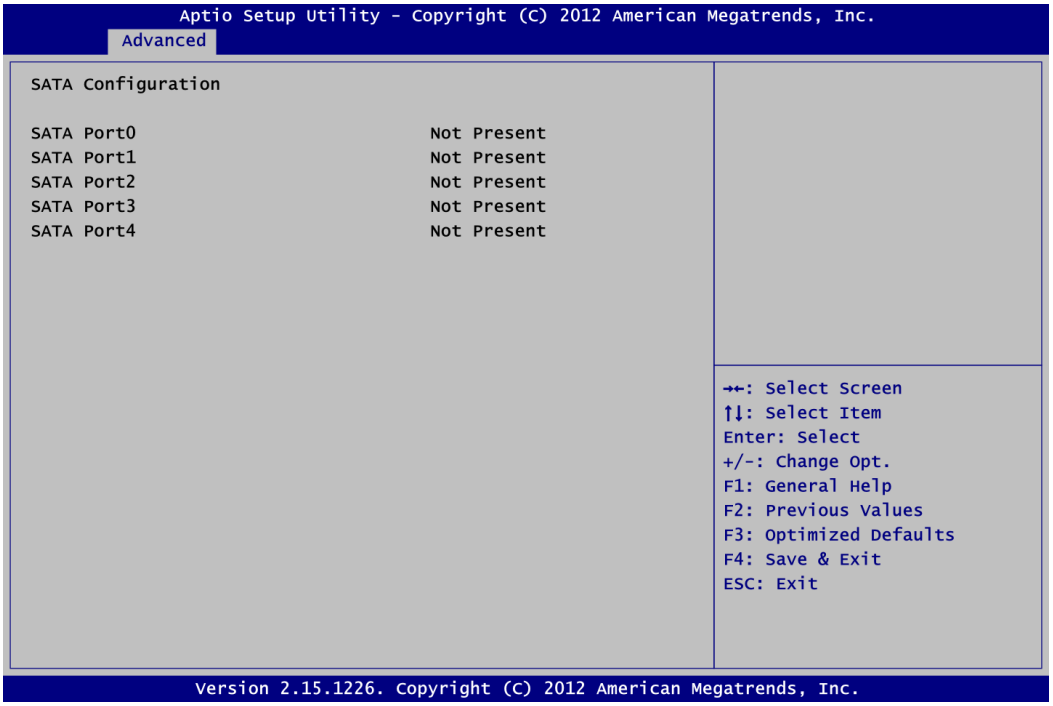
Current Status Information
Display current TPM status information.

- **CPU Configuration**
  This screen shows the CPU information.

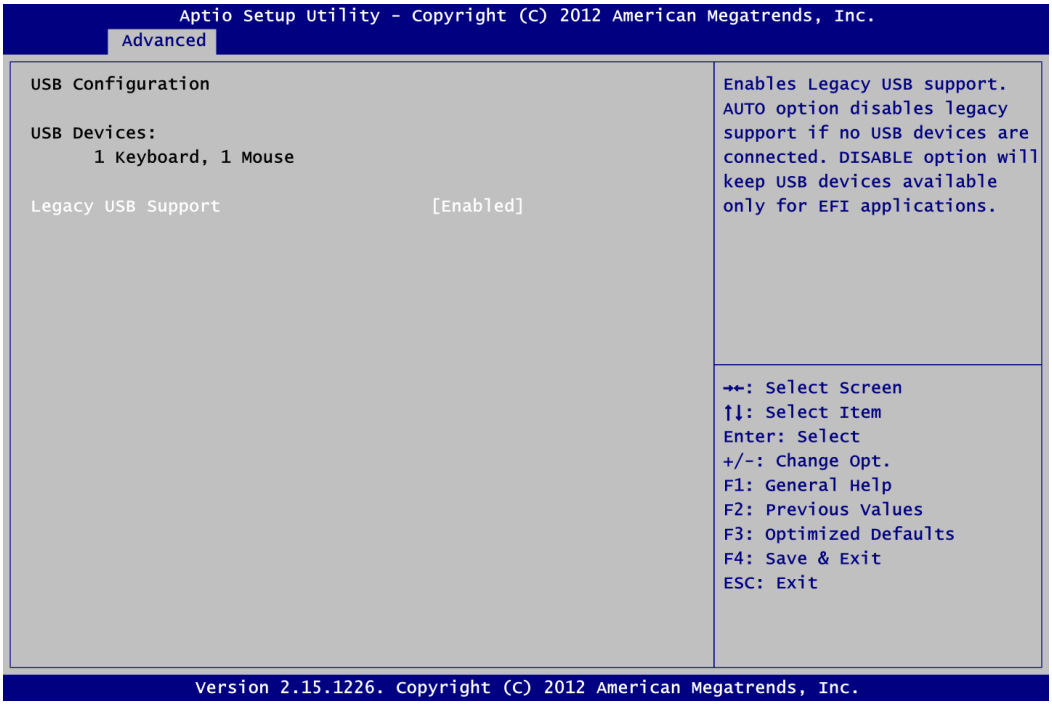

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
CPU Configuration
Module Version: 4.6.5.1 TrinityPI 019
AGESA Version : 1.0.0.9
Socket0: AMD R-272F APU with Radeon(tm) HD Graphics
Dual Core Running @ 2755 MHz 675 mV
Max Speed:2700 MHZ Intended Speed:2700 MHZ
Min Speed:900 MHZ
Microcode Patch Level: 6001119
--------- Cache per Core ---------
L1 Instruction Cache: 64 KB/2-way
L1 Data Cache: 16 KB/4-way
L2 Cache: 1024 KB/16-way
No L3 Cache Present
C6 Mode [Enabled]
Enable/Disable C6.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.

C6 Mode
Enable or disable C6 mode.

- **SATA Configuration**
  In this Configuration menu, you can see the currently installed hardware in the SATA ports. During system boot up, the BIOS automatically detects the presence of SATA devices.



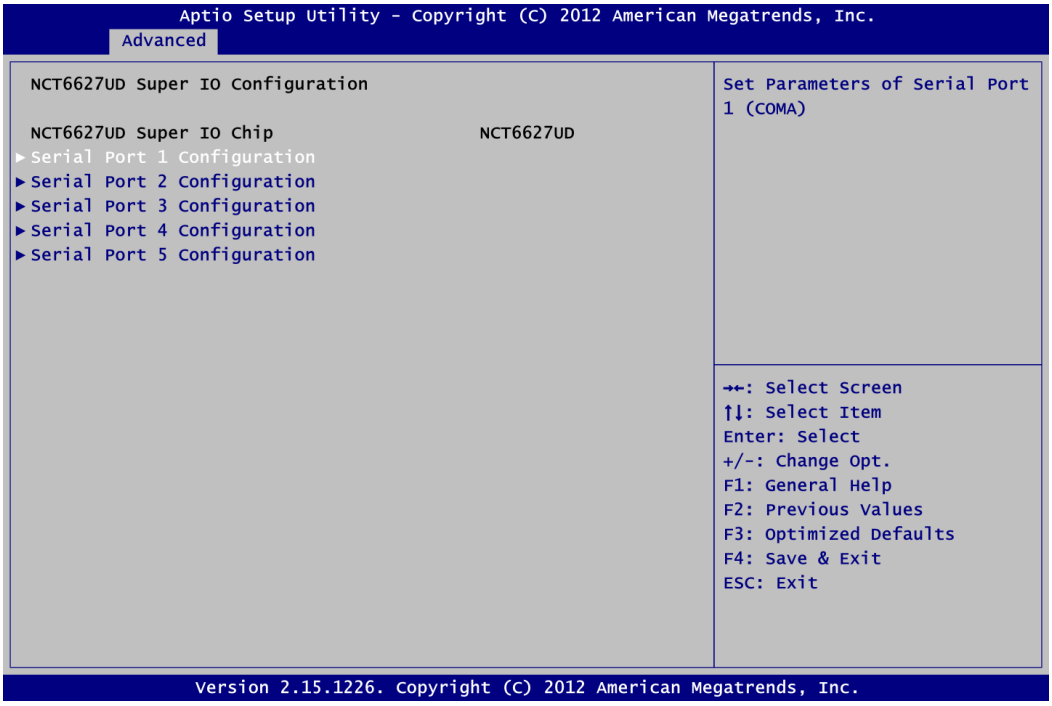
- **USB Configuration**
  You can use this screen to select options for the USB Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
USB Configuration
USB Devices:
1 Keyboard, 1 Mouse
Legacy USB Support [Enabled]
Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.

USB Devices
Display all detected USB devices.

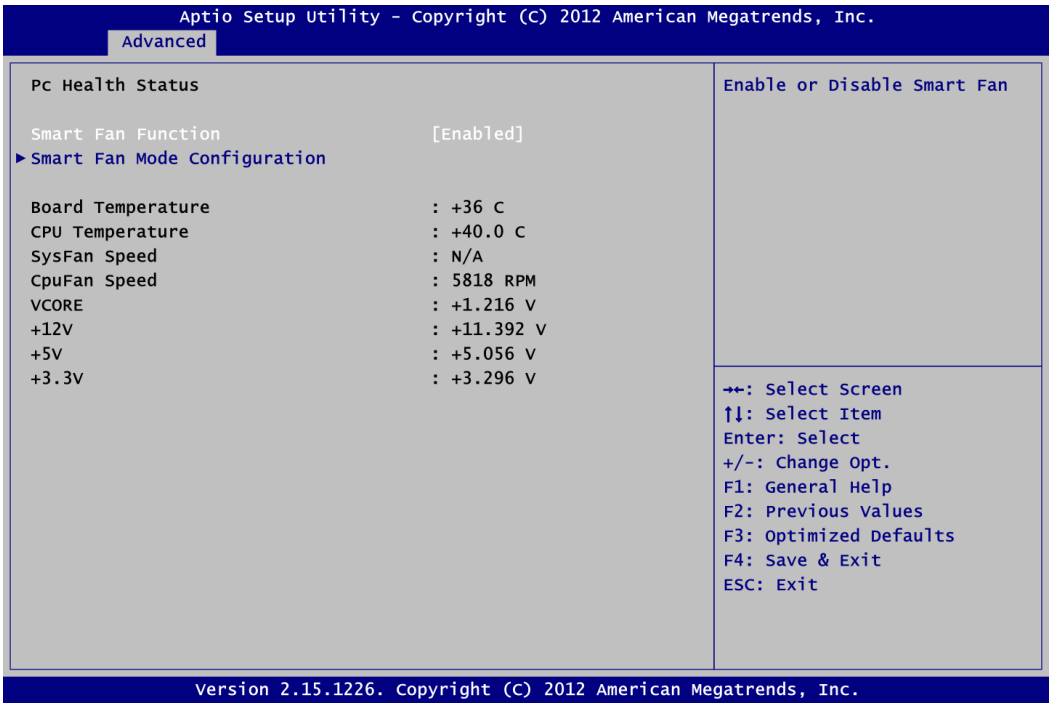
Legacy USB Support
Use this item to enable or disable support for USB device on legacy operating system. The default setting is Enabled. Auto option disables legacy support if no USB devices are connected. Disable option will keep USB devices available only for EFI applications.

- **NCT6627UD Super IO Configuration**
  You can use this screen to select options for the Super IO Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "▶", please press <Enter> for more options.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
NCT6627UD Super IO Configuration
NCT6627UD Super IO Chip NCT6627UD
▶ Serial Port 1 Configuration
▶ Serial Port 2 Configuration
▶ Serial Port 3 Configuration
▶ Serial Port 4 Configuration
▶ Serial Port 5 Configuration
Set Parameters of Serial Port 1 (COMA)
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.

Serial Port 1~5 Configuration
Use this item to set parameters of serial port 1 to 5.

- **NCT6627UD HW Monitor**
  Use this screen for Smart Fan configuration and hardware health status monitoring.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
Pc Health Status
Smart Fan Function [Enabled]
Smart Fan Mode Configuration
Board Temperature : +36 C
CPU Temperature : +40.0 C
SysFan Speed : N/A
CpuFan Speed : 5818 RPM
VCORE : +1.216 V
+12V : +11.392 V
+5V : +5.056 V
+3.3V : +3.296 V
Enable or Disable Smart Fan
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.

This screen displays the temperature of system and CPU, cooling fan speed in RPM and system voltages (VCORE, +12V, +5V and +3.3V).

Smart Fan Function
Enable or disable Smart Fan function.

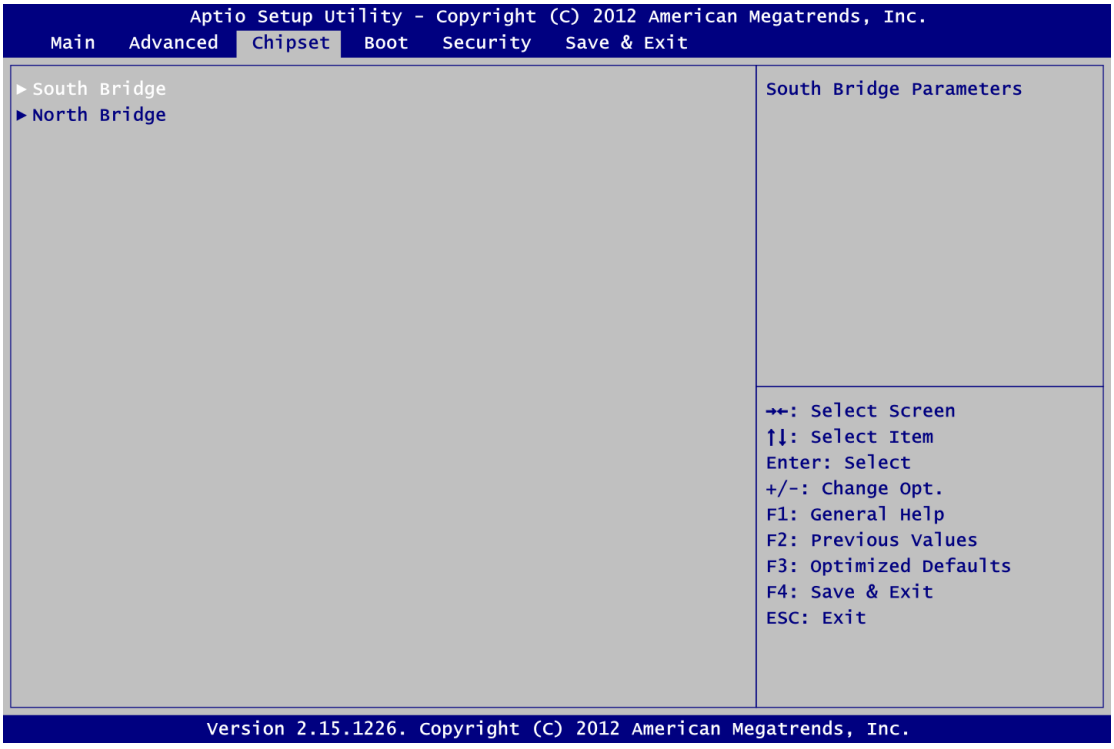
Smart Fan Mode Configuration
This option is for Smart Fan mode configuration.

5.5 Chipset Menu

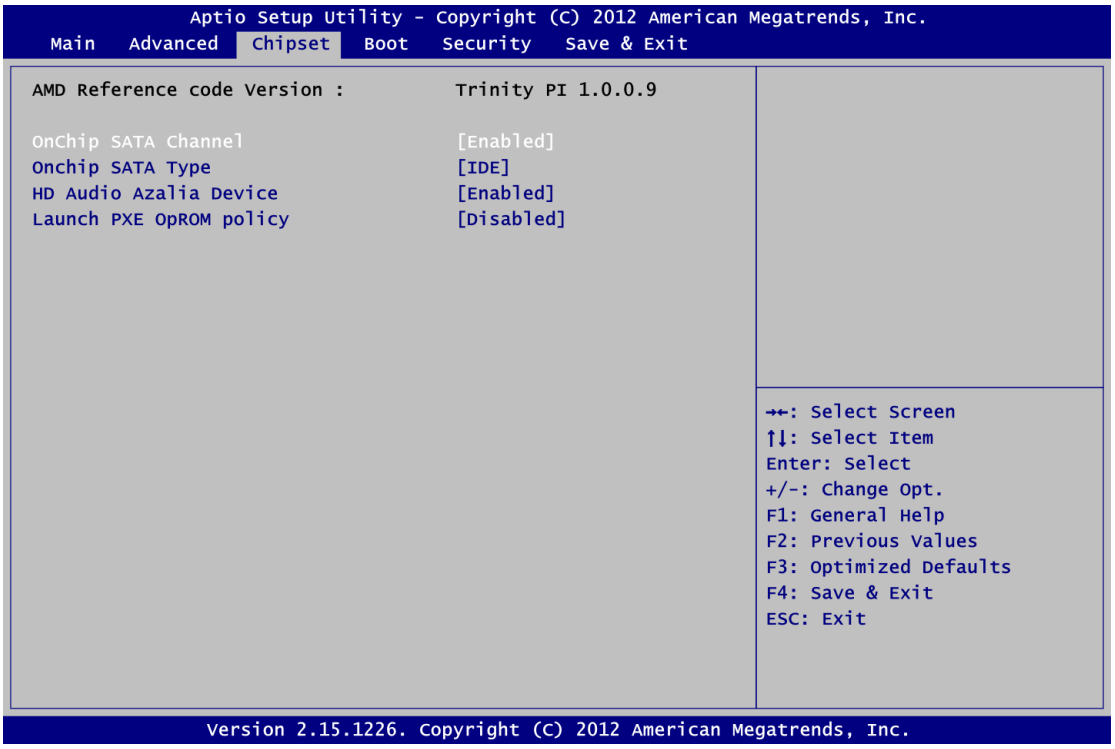
The Chipset menu allows users to change the advanced chipset settings. You can select any of the items in the left frame of the screen to go to the sub menus:

- ► South Bridge
- ► North Bridge

For items marked with "►", please press <Enter> for more options.



- **South Bridge**
  This screen allows users to configure parameters of South Bridge chipset.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
AMD Reference code Version : Trinity PI 1.0.0.9
OnChip SATA Channel [Enabled]
Onchip SATA Type [IDE]
HD Audio Azalia Device [Enabled]
Launch PXE OpROM policy [Disabled]
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.

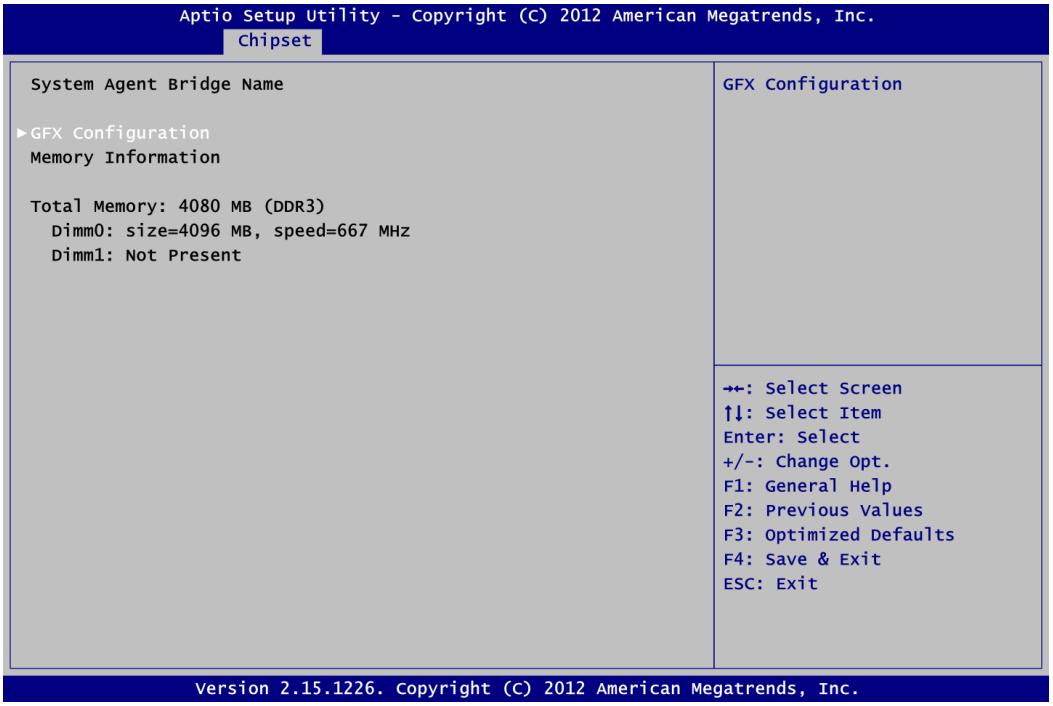
OnChip SATA Channel
Enable or disable SATA channel.

OnChip SATA Type
Here are the options: IDE, RAID and AHCI.

HD Audio Azalia Device
Enable or disable HD audio Azalia device.

Launch PXE OpROM policy
Control the execution of UEFI and Legacy PXE OpROM.

- **North Bridge**
  This screen allows users to configure parameters of North Bridge chipset. For items marked with "►", please press <Enter> for more options.

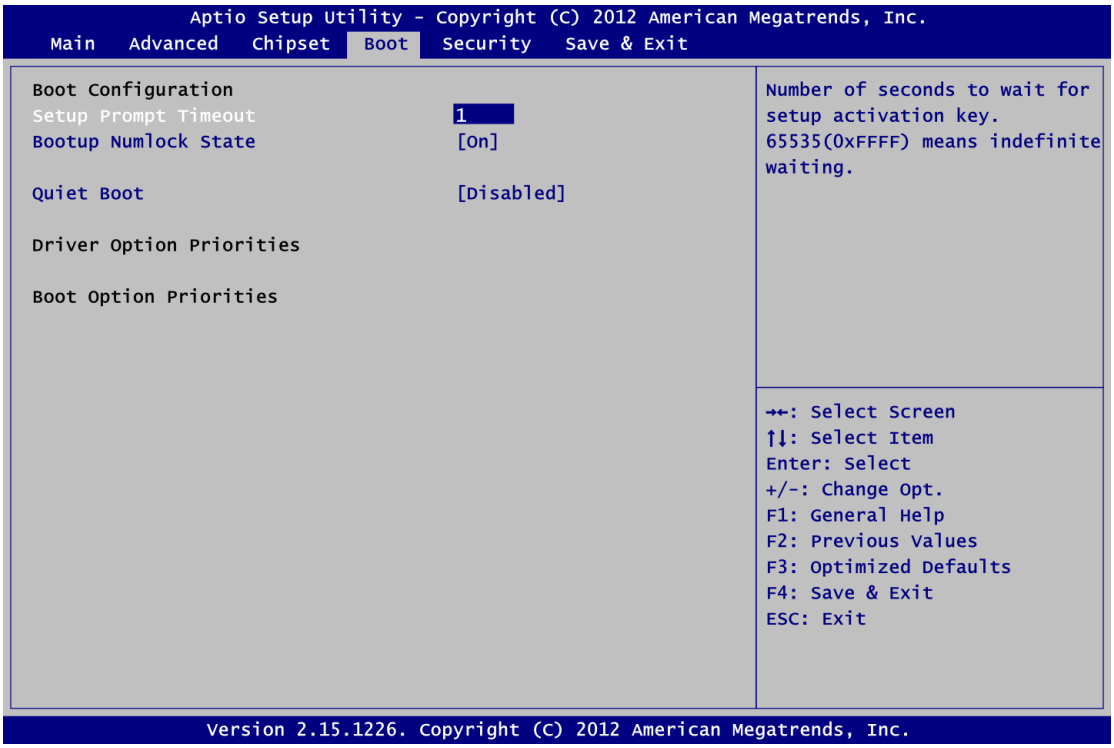


GFX Configuration
This option allows users to set GFX Configuration.

Memory Information
Display system memory information.

5.6 Boot Menu

The Boot menu allows users to change boot options of the system.



- **Setup Prompt Timeout**
  Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

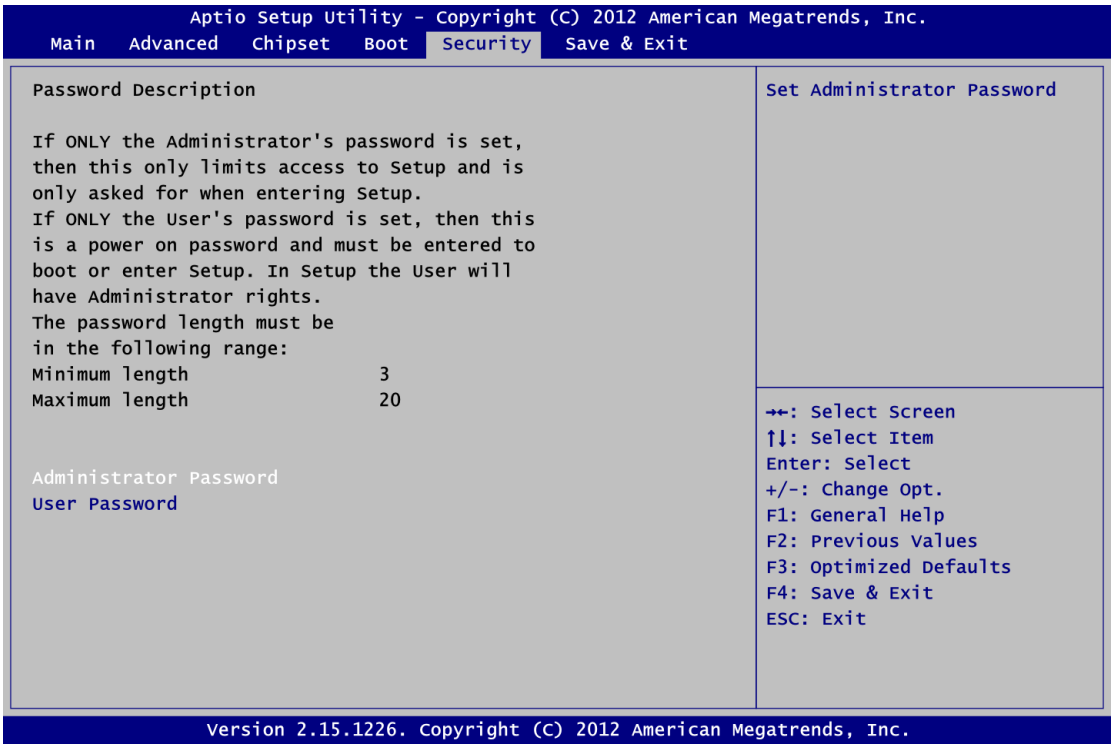
- **Bootup NumLock State**
  Use this item to select the power-on state for the keyboard NumLock.

- **Quiet Boot**
  Select to display either POST output messages or a splash screen during boot-up.

- **Boot Option Priorities**
  These are settings for boot priority. Specify the boot device priority sequence from the available devices.

5.7 Security Menu

The Security menu allows users to change the security settings for the system.

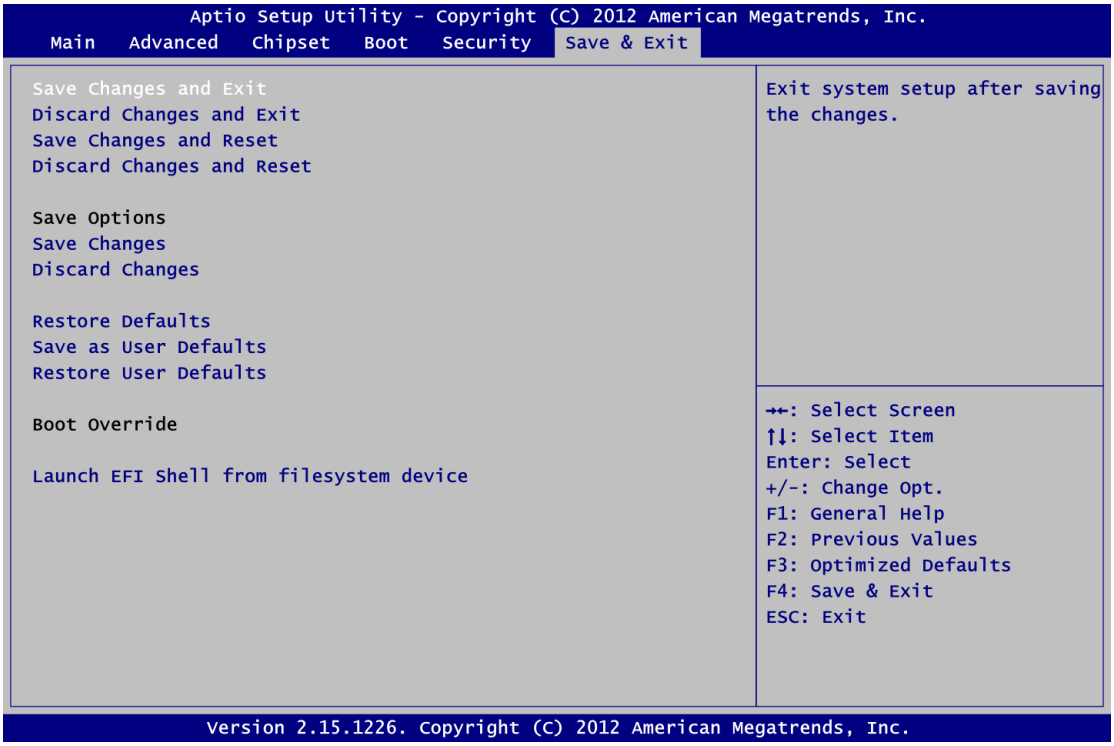

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Password Description
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.
The password length must be in the following range:
Minimum length 3
Maximum length 20
Administrator Password
User Password
Set Administrator Password
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.

- **Administrator Password**
  This item indicates whether an administrator password has been set (installed or uninstalled).

- **User Password**
  This item indicates whether an user password has been set (installed or uninstalled).

5.8 Save & Exit Menu

The Save & Exit menu allows users to load your system configuration with optimal or fail-safe default values.



- **Save Changes and Exit**
  When you have completed the system configuration changes, select this option to leave Setup and return to Main Menu. Select Save Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to save changes and exit.

- **Discard Changes and Exit**
  Select this option to quit Setup without making any permanent changes to the system configuration and return to Main Menu. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to discard changes and exit.

- **Save Changes and Reset**
  When you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect. Select Save Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to save changes and reset.

- **Discard Changes and Reset**
  Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer. Select Discard Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to discard changes and reset.

- **Save Changes**
  When you have completed the system configuration changes, select this option to save changes. Select Save Changes from the Save & Exit menu and press <Enter>. Select Yes to save changes.

- **Discard Changes**
  Select this option to quit Setup without making any permanent changes to the system configuration. Select Discard Changes from the Save & Exit menu and press <Enter>. Select Yes to discard changes.

- **Restore Defaults**
  It automatically sets all Setup options to a complete set of default settings when you select this option. Select Restore Defaults from the Save & Exit menu and press <Enter>.

- **Save as User Defaults**
  Select this option to save system configuration changes done so far as User Defaults. Select Save as User Defaults from the Save & Exit menu and press <Enter>.

- **Restore User Defaults**
  It automatically sets all Setup options to a complete set of User Defaults when you select this option. Select Restore User Defaults from the Save & Exit menu and press <Enter>.

- **Boot Override**
  Select a drive to immediately boot that device regardless of the current boot order.

- **Launch EFI Shell from filesystem device**
  Attempt to launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.

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Chapter 6
Dash User Guide

Active DASH Configuration Setup Agent

Please check the PXE remote boot is enabled as Figure 1(a), (b) before you use this agent. During the late of BIOS POST, you can press ***Shift + F10*** to launch this agent as Figure 2(a). You need to supply a valid login username and password pair for authentication. The default account name is **Administrator** with the corresponding password **Realtek** as Figure 2(b). After successful authentication, you can change the network settings along with the account information. Figure 3 shows the screen shoot of the agent. Please press ***F4*** to save the changes whenever you want to modify settings.

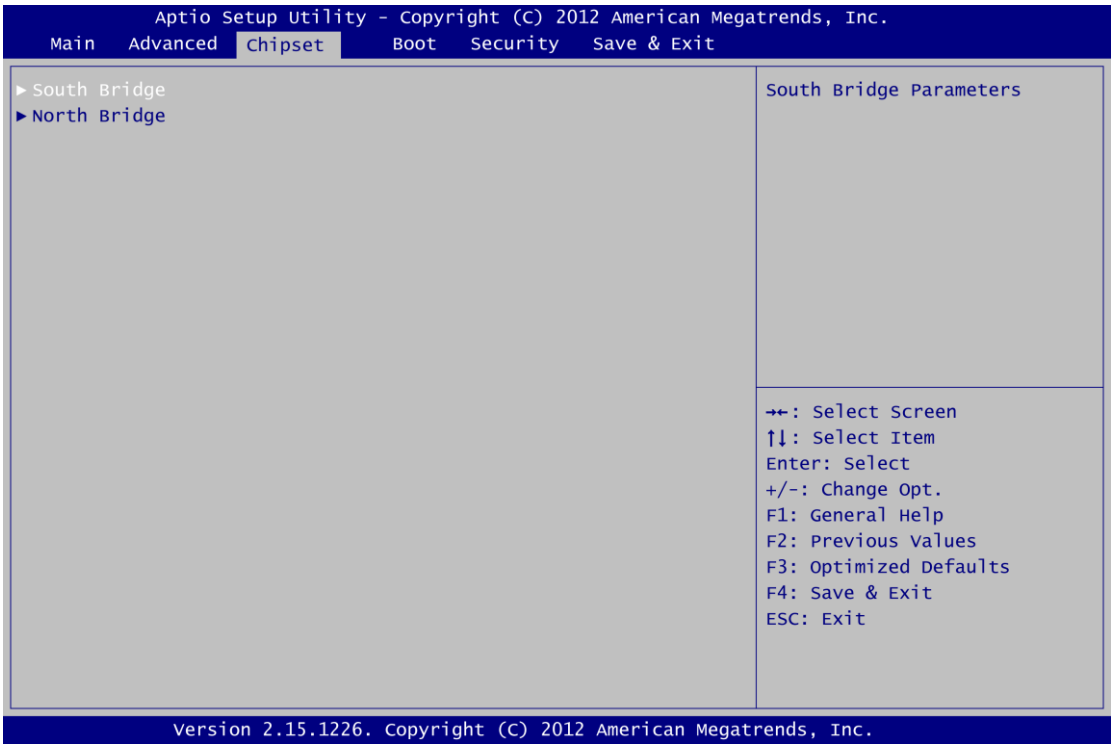

Figure 1(a) Chipset Configuration

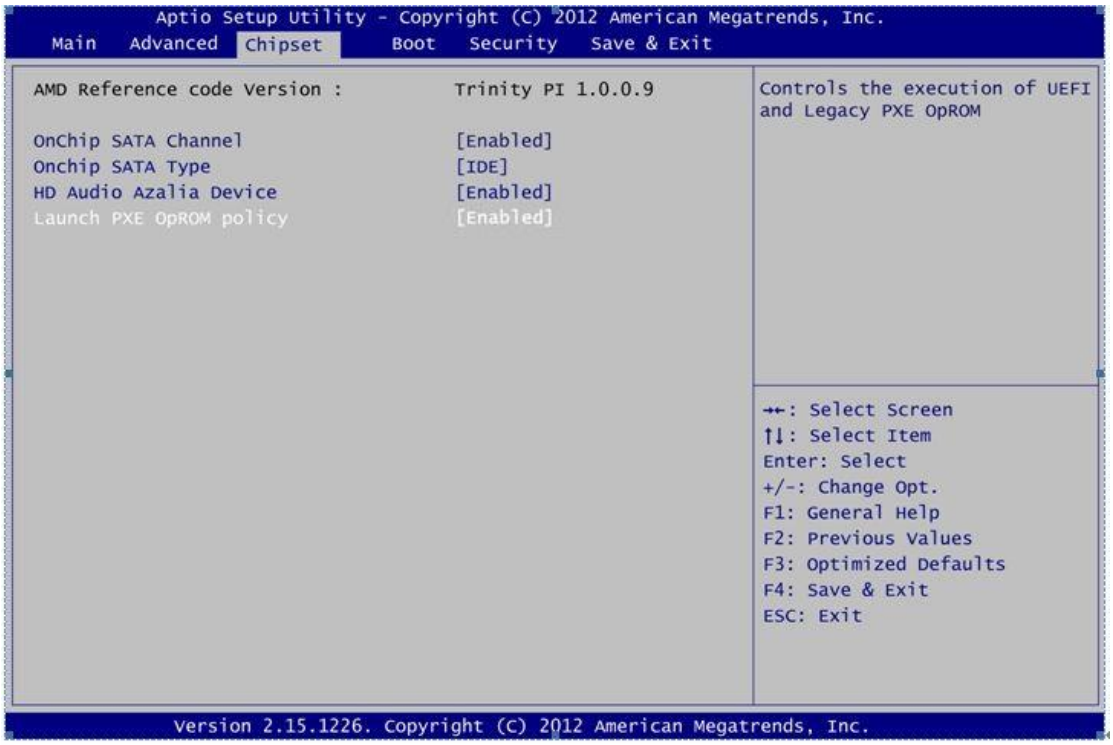
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
AMD Reference code Version : Trinity PI 1.0.0.9
OnChip SATA Channel [Enabled]
Onchip SATA Type [IDE]
HD Audio Azalia Device [Enabled]
Launch PXE OpROM policy [Enabled]
Controls the execution of UEFI and Legacy PXE OpROM
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.

Figure 1(b) Chipset Configuration

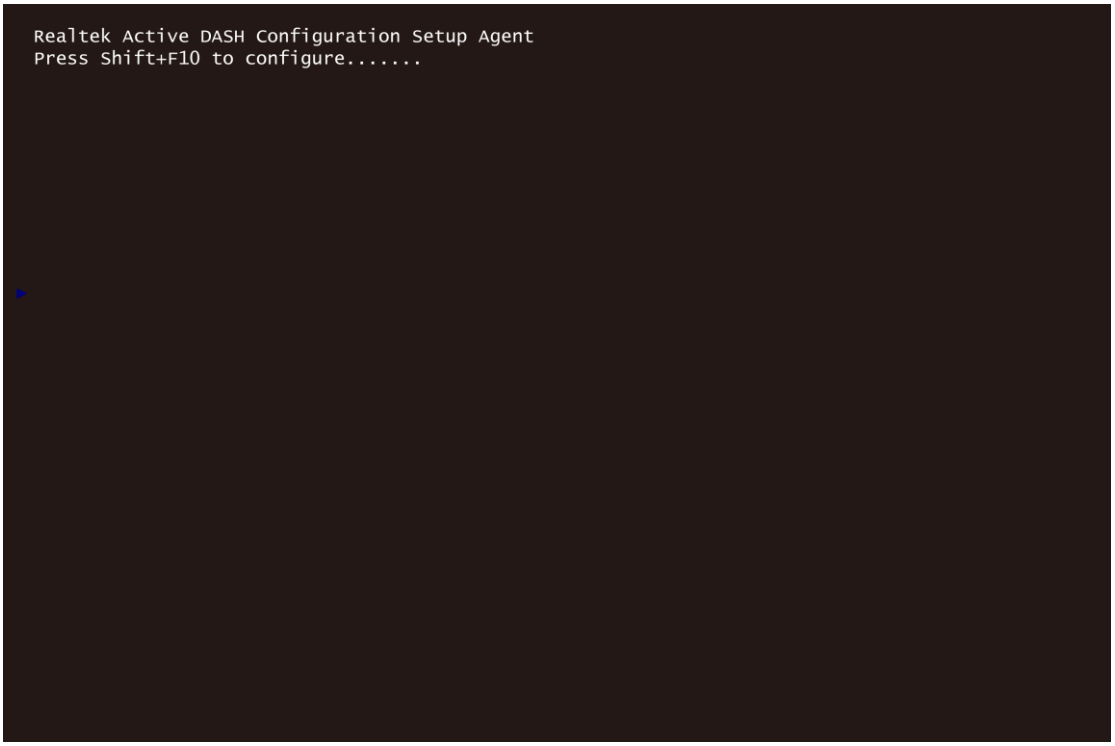

Figure 2(a) Enter into DASH Configuration Setup Agent

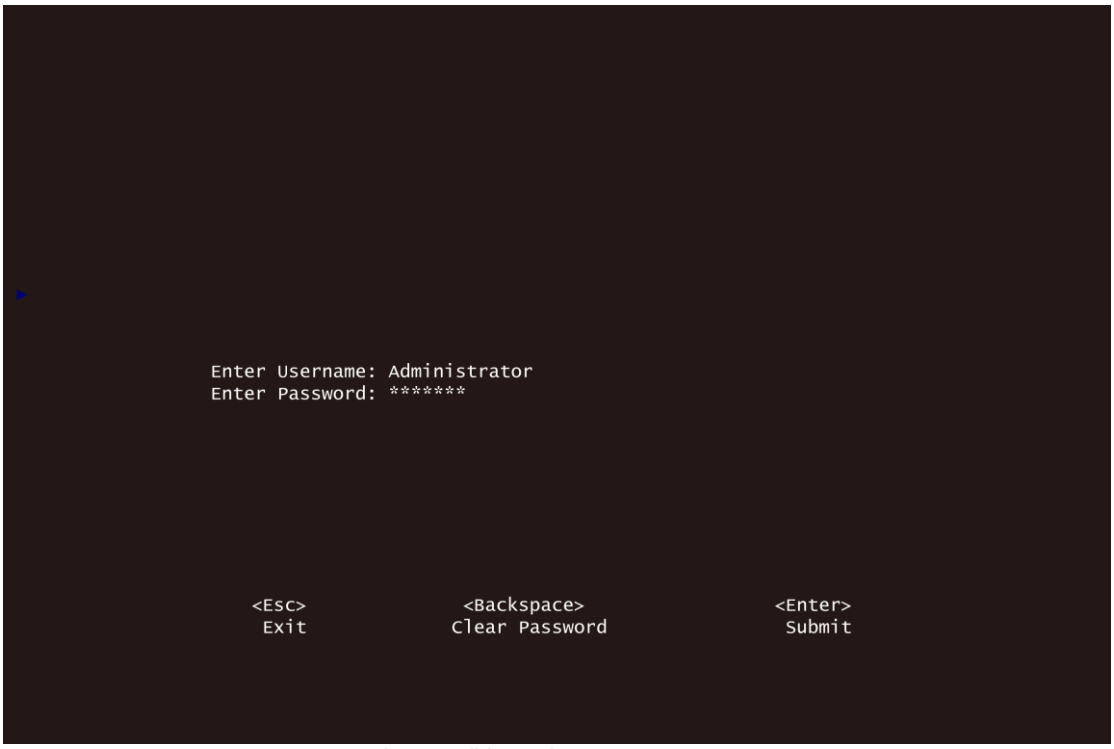

Figure 2(b) Login to setup Agent

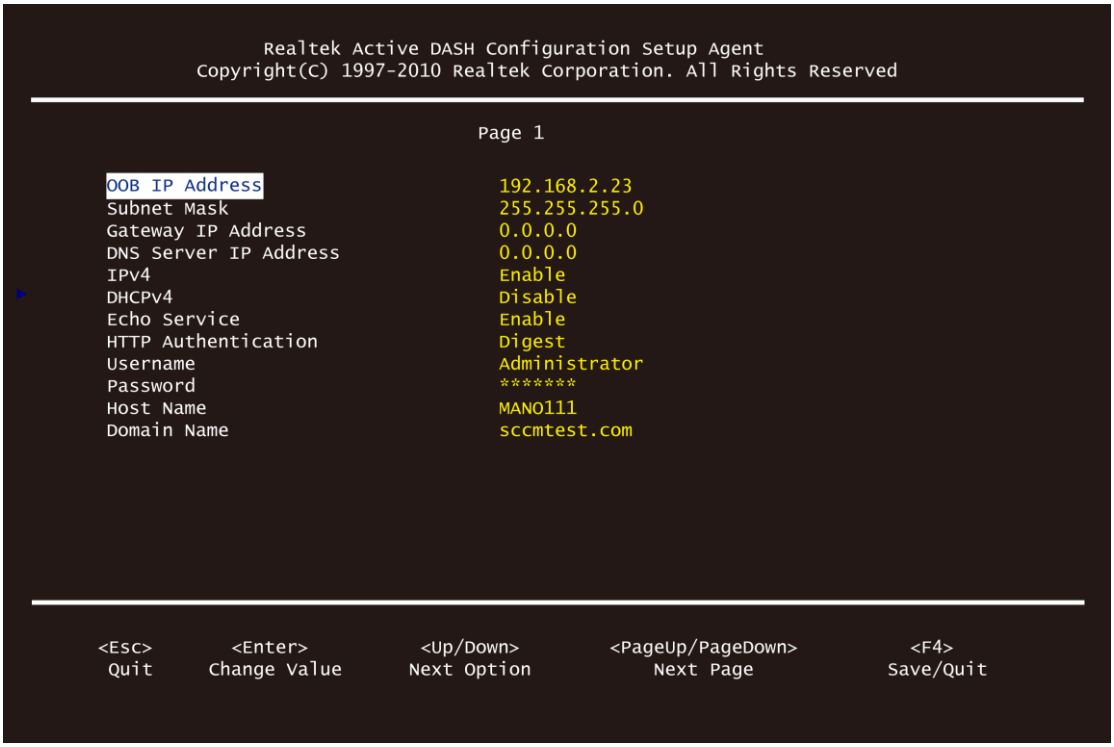

Figure 3: Active DASH Configuration Setup Agent

BIOS Settings

Before you can use text console redirection service provided by Realtek's DASH controller, you must have a supported BIOS and correct settings. Figure 4 depicts the settings needed in the AMI BIOS. You should always follow the settings shown in the figure for best performance and compatibility.

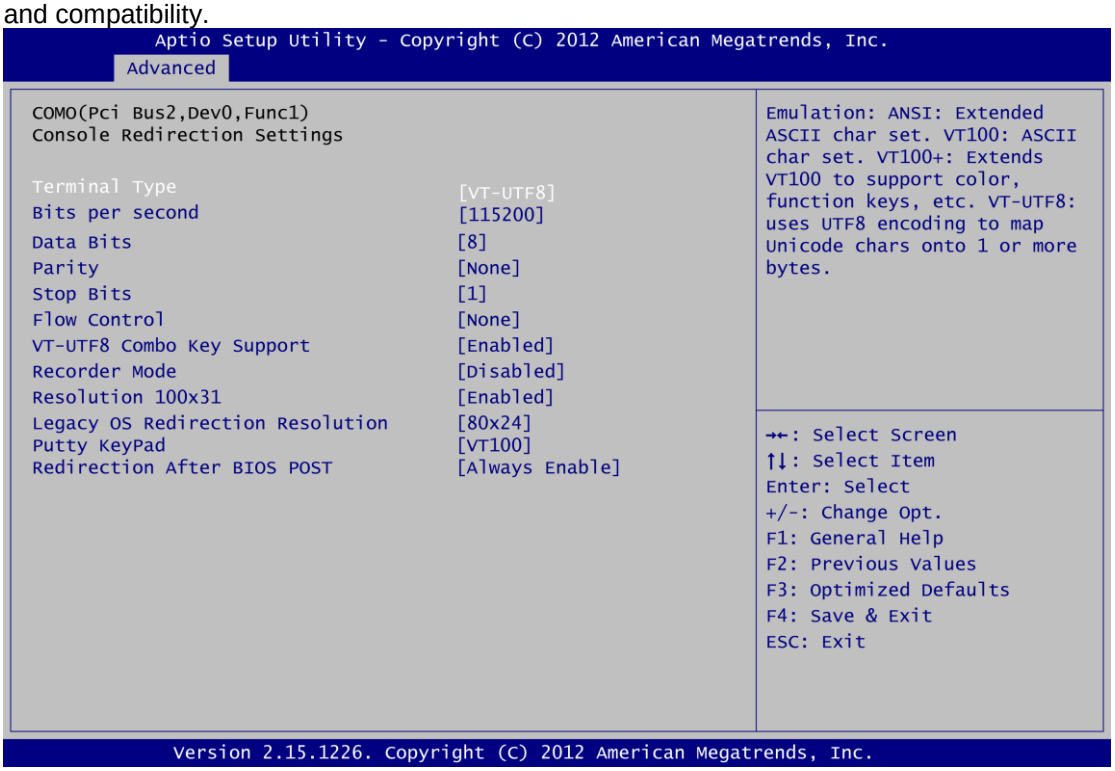
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
COM0(Pci Bus2,Dev0,Func1)
Console Redirection Settings
Terminal Type [VT-UTF8]
Bits per second [115200]
Data Bits [8]
Parity [None]
Stop Bits [1]
Flow Control [None]
VT-UTF8 Combo Key Support [Enabled]
Recorder Mode [Disabled]
Resolution 100x31 [Enabled]
Legacy OS Redirection Resolution [80x24]
Putty KeyPad [VT100]
Redirection After BIOS POST [Always Enable]
Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.

Figure 4: Console Redirection Settings For AMI BIOS

If you are using AMI BIOS, you need to enable **MTCP support** and **ASF support** in the advanced tab within BIOS as Figure 5(a), (b). Without these settings, firmware cannot perform remote control operations and PLDM transfers through SMBus. To use USB redirection service, you should always check the settings of USB controllers. Please check USB controllers is in **HighSpeed** mode to get the best performance. Also note that any change between **Fullspeed** and **HighSpeed**, a power off operation is required to get it work correctly.

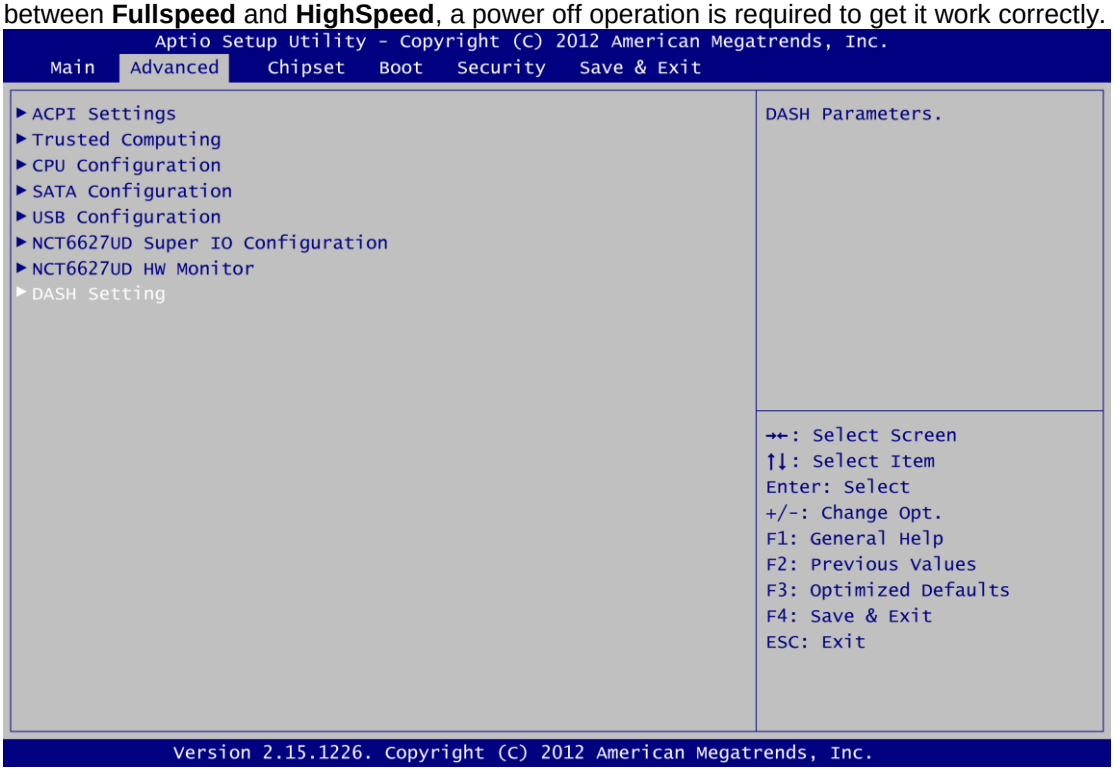

Figure 5(a) Advanced tab within BIOS

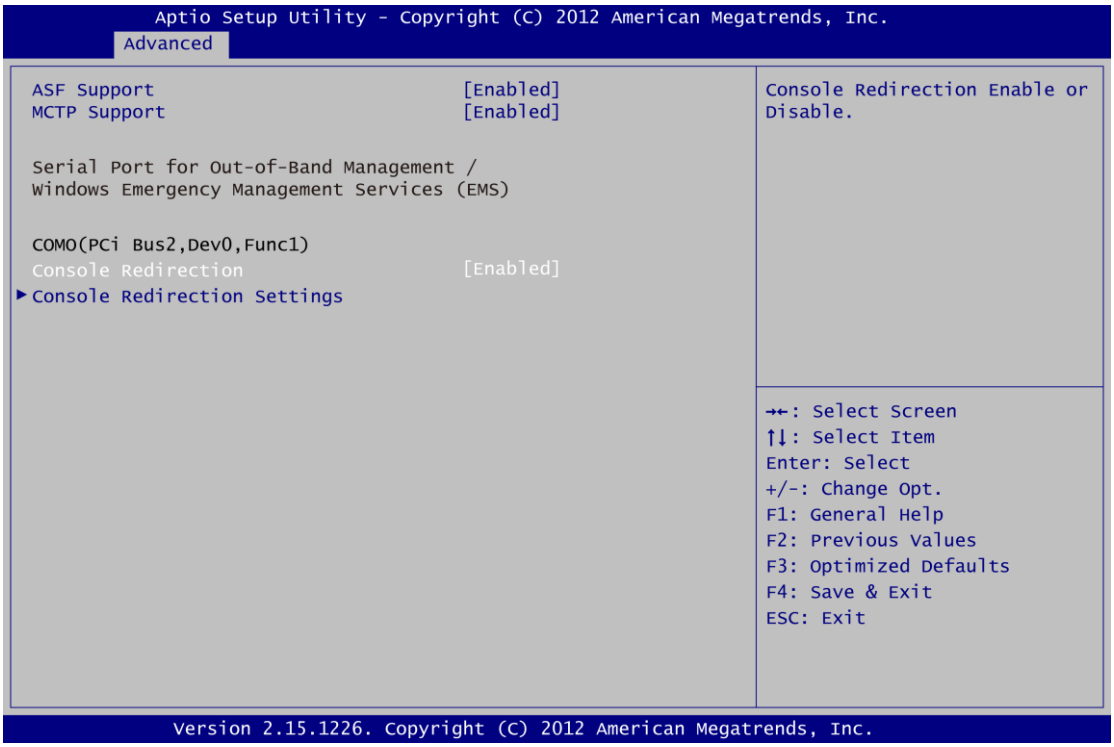

Figure 5(b) DASH Setting

SOFTWARE INSTALLATION

You must have to install **Realtek Management Console** under Windows Vista or Windows with version above Vista, such as Windows 7 and Windows Server 2008. These operating systems have a built-in cipher suite called **TLS_RSA_WITH_ASE_128_CBC_SHA** that is a requirement for DASH implementation. For Windows server 2003, please download AES hot fix on the following URL to have the supported cipher suite.

http://support.microsoft.com/hotfix/KBHotfix.aspx?kbnum=948963&kbln=en-us

In addition to **Realtek Management Console**, which should be installed in the console side, we have a client tool. The client tool must be installed in the client side, which is the DASH enabled computer. The client tool is responsible for graceful remote operations, gathering in-band software information, and providing a user interface for opaque store management, such as shown in Figure 6.

Figure 6: Realtek Client Tool

DISCOVER COMPUTERS

You can use **Discovery** page to discover computers capable of ASF or DASH. In the discovery phase, one can discover ASF or DASH manageable computers by giving a range of IP addresses along with port lists and protocols specified. When computers are discovered, they would be shown in the window. By double clicking the discovered IP, a **Manageability** page would appear. Figure 7 shows the results when discovering a range of computers from 192.168.0.1 to 192.168.0.255. In addition to the current discovered devices, computers ever discovered are also listed in the left pane of the window.

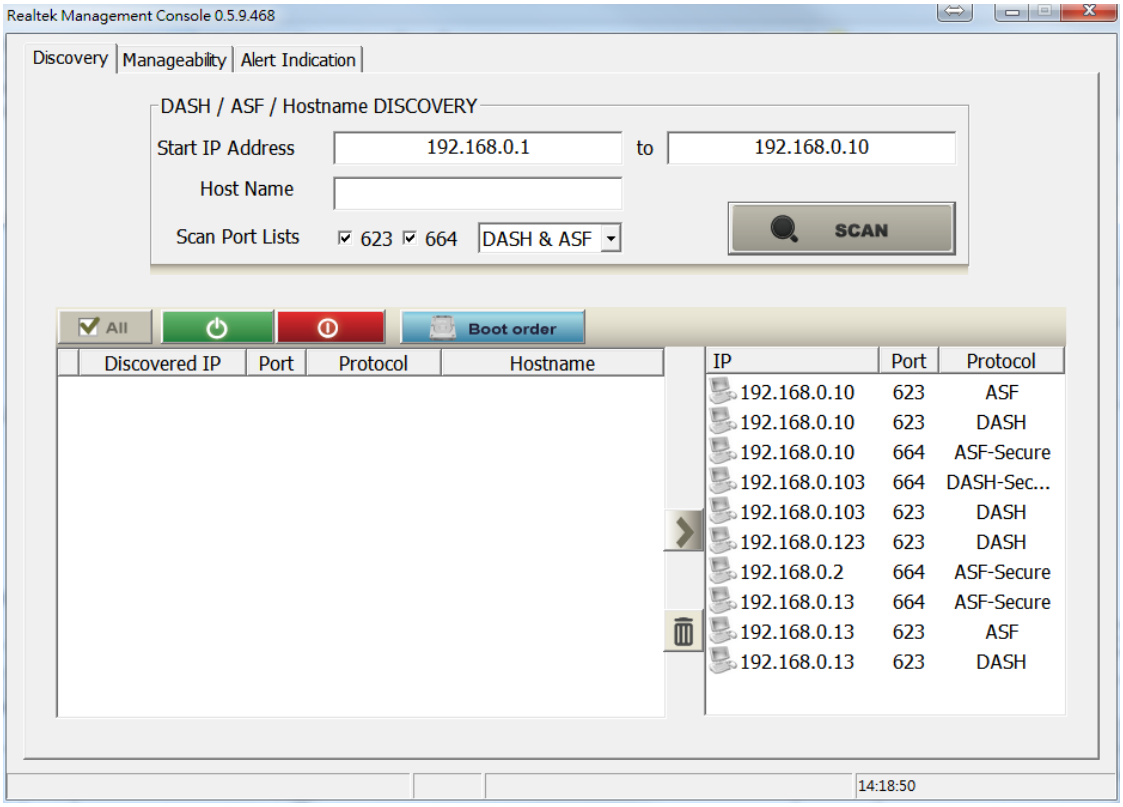

Figure 7: Discover Manageable Devices

In **Manageability** page, you can manually set the IP address and the port number associated with a specific DASH enabled computer. Another alternative is to use the discovered IP address and port number, which would be automatically filled into corresponding fields whenever you have completed the discovery phase. Please use a valid username and password pair to login. After successful login, a new pop-out window with all supported profiles would appear, such as shown in Figure 8.

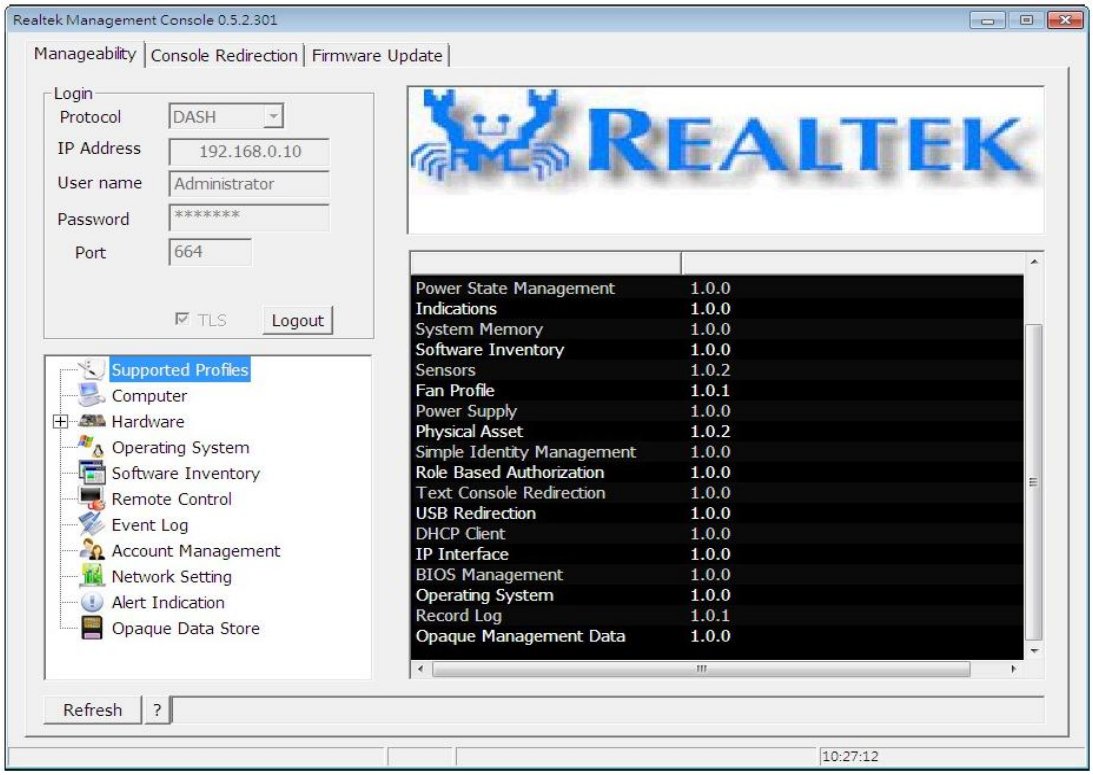

Figure 8: Registered Profiles

REMOTE CONTROL

In the **Remote Control** node, you can **power on, power off, power reset, or power recycle** the DASH capable computer. You can use the check box to specify the boot device during next booting. Currently this feature is based on "***PLDM for BIOS Control and Configuration Specification***" and the system needs at least a one-time boot before you could get attached bootable devices. Figure 9 shows the snap shot of this feature.

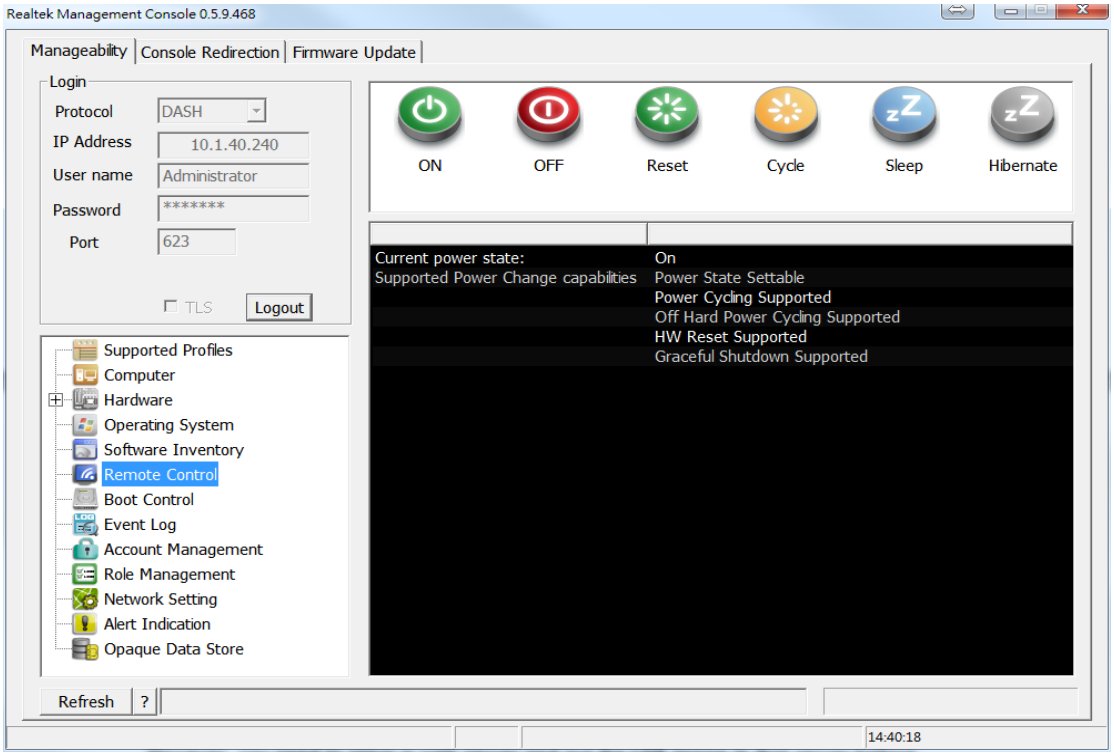

Figure 9: Remote Control And Boot Device Order Change

REDIRECTION SERVICES

Realtek's DASH controller supports two redirection services, text console redirection and USB redirection services. These two features can be found in the **Console Redirection** tab, such as shown in Figure 10. For USB redirection, Reatek's DASH controller supports both listen mode and connect mode. Using listen mode, users can redirect a pre-created image, CD-ROM drive, USB dongle and floppy from a remote console as if the device is plugged within the client computer. You can use the check box to choose an image file or a physical drive for redirection. By pressing the **"…"** button, you must specify the file name or the drive letter used for redirection before starting redirection service. Besides, except for CD-ROM drive redirection, Realtek's USB redirection also implements write operations, which means you can write data from the client side back to the console side.

AMD's DASH SDK only supports connect mode, which is also implemented in our management console. You can check the **Using URL** and provide a valid URL to do the same thing. However, you need to setup a web server and put the USB image in that server before enabling the USB redirection service. Only read operations are supported in connect mode. If write operations are needed, please consider using listen mode instead.
For text console redirection, Realtek's DASH controller has the ability to directly enter BIOS setup or pop out a BBS screen without user's pressing any key during the booting time. This can reduce the effort for users when they want to enter BIOS setup or just temporary change boot device. Whenever a new option is chosen (**Normal Boot**, **Enter BIOS Setup**, and **Enter BBS Popout**), you should press the **Stop TCR** button first and then press the **Start TCR** button to get it work correctly.

When **Start TCR** button is pressed, the remote control function would also be invoked, according to the selected check box in the **Redirection After** field. This means that you can do text console redirection right now without doing any remote operation, or do it the next time when the computer boots.
Both **TELNET** and **SSH** protocols are supported in Realtek's DASH controller. You can choose to use either of them according to your need. Both of them need a valid credential before you can start to use text console redirection service. The credential is the same with that for DASH.

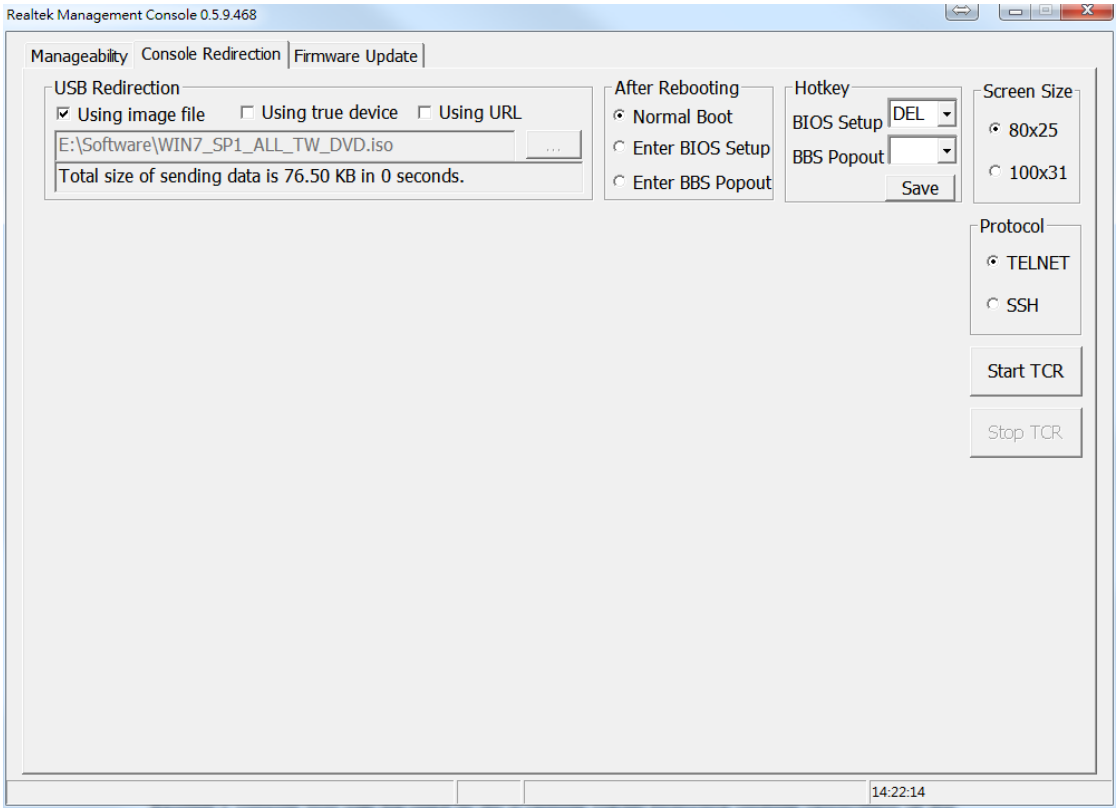

Figure 10: Redirection Services

FIRMWARE UPDATE

Realtek's console tool can be used to do a remote DASH firmware update regardless of the power state. This means that even in the S5 state (without any operating system), we can do a firmware update process. To use this feature, a user must first login with username **Administrator**, which is the only granted account to perform DASH firmware update. In the **Firmware Update** page, click **"…"** to browse a new firmware file, and then click **Start Update** to begin the firmware update process, such as shown in Figure 11.

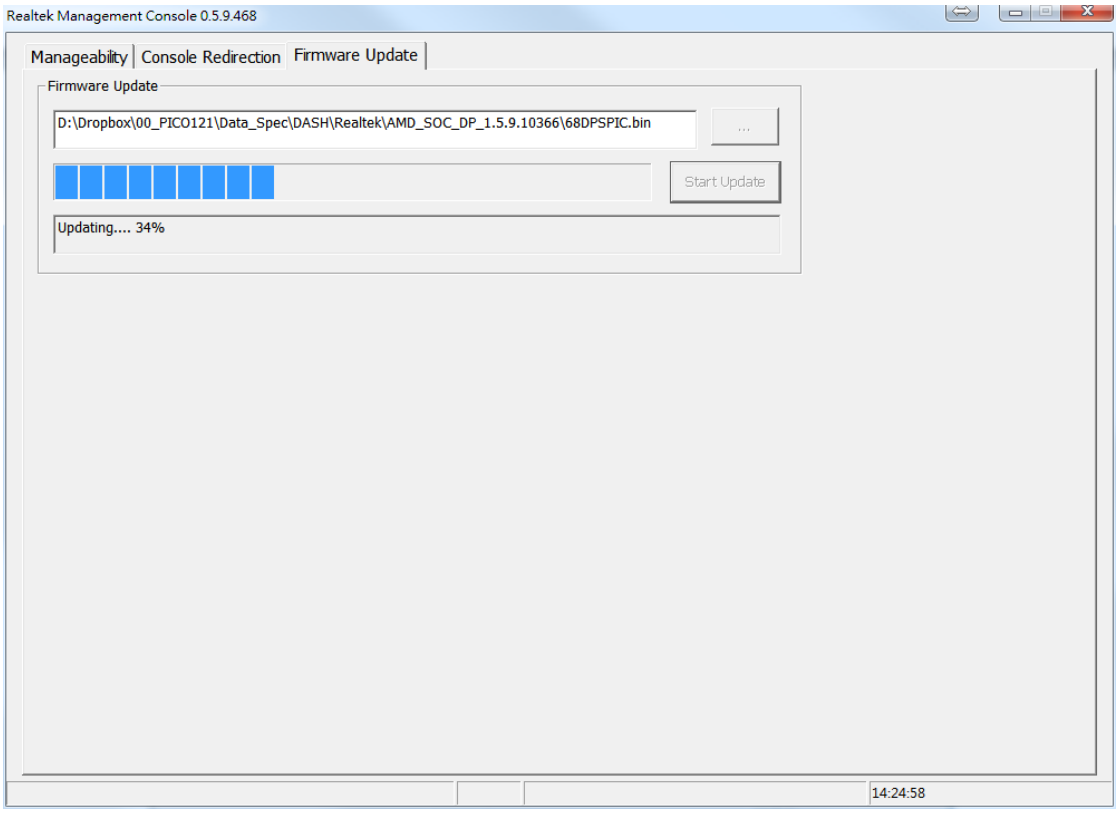

Figure 11: Firmware Update

If the firmware update process unfortunately fails, you may probably not be able to login into the DASH capable computer. Don't be panic, the DASH controller is still in the firmware update mode and able to receive the new firmware binary again. Please login with **Administrator** and the associated valid **password.** Ignore the **"Cannot login! Please check User name and Password"** message. Go to the **Firmware Update** page and perform firmware update again, the new firmware can still be updated to the DASH controller without any problem**.**

BUILT-IN WEB SERVER

Realtek's DASH controller has a built-in web server with HTTP and HTTPS (TLS). The default port for HTTP is 623 while that for HTTPS is 664. You can login the web server to perform some simple management functions, such as basic hardware information query, remote control, event log browsing and network settings. Figure 12 shows the snap shot of the built-in web server. For TLS to work correctly, please check
TLS_RSA_WITH_ASE_128_CBC_SHA cipher suite has been installed in the console side's operating system if you use Internet Explorer as a web browser.
Another alternative is to use different browsers, such as Firebox, which itself supports **TLS_RSA_WITH_ASE_128_CBC_SHA** cipher suite.

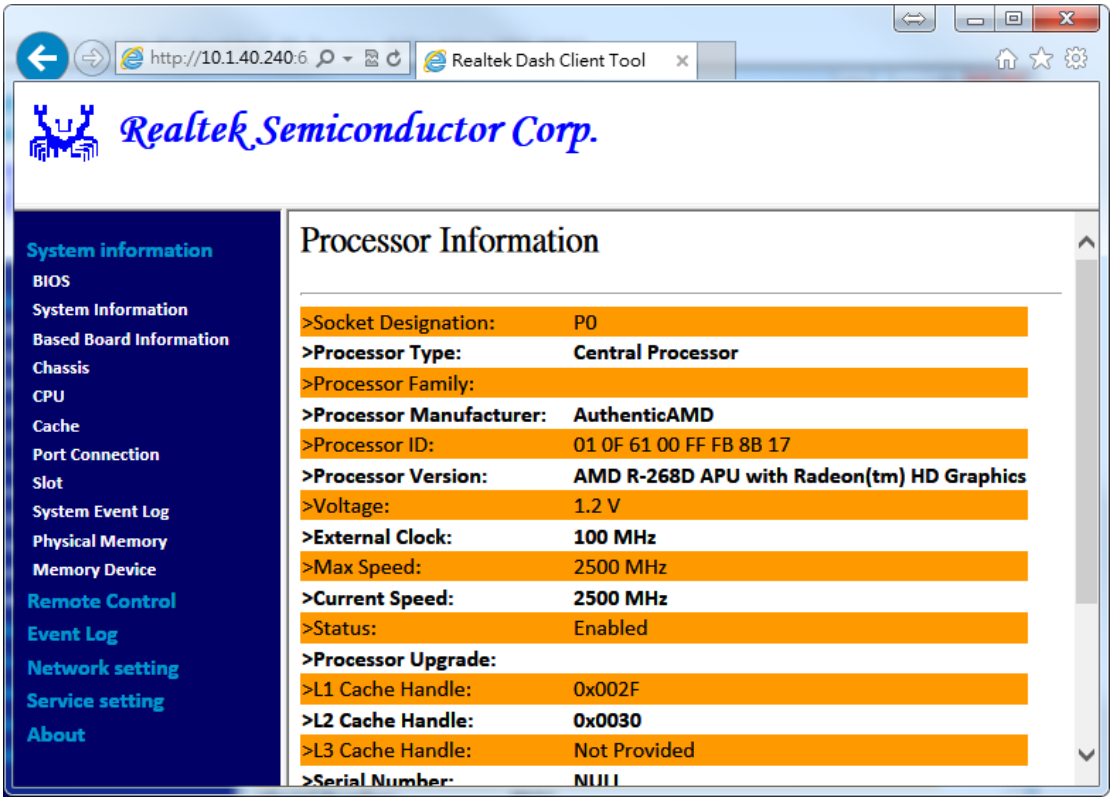

FIGURE 12: BULIT-IN WEB SERVER

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Appendix A
Watchdog Timer

About Watchdog Timer

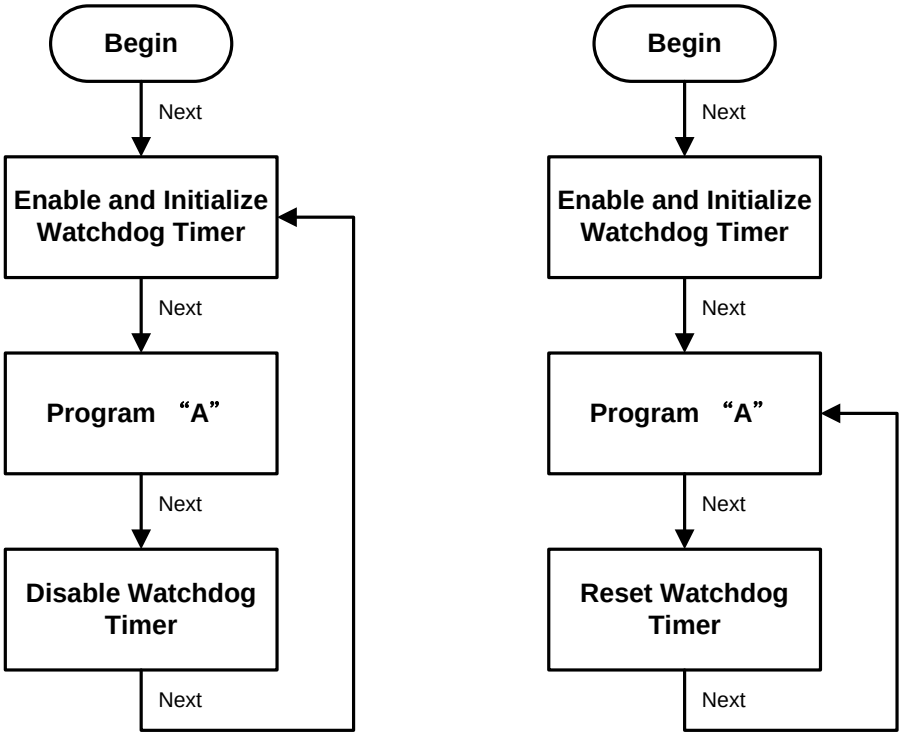
Software stability is major issue in most application. Some embedded systems are not watched by human for 24 hours. It is usually too slow to wait for someone to reboot when computer hangs. The systems need to be able to reset automatically when things go wrong. The watchdog timer gives us solution.

The watchdog timer is a counter that triggers a system reset when it counts down to zero from a preset value. The software starts counter with an initial value and must reset it periodically. If the counter ever reaches zero which means the software has crashed, the system will reboot. The integrated watchdog timer can be set up by programming. There are 1~255 levels available.

How to Use Watchdog Timer

Assume that program A needs to keep running in a system. The value of watchdog timer must be set bigger than the running time of program A. Then, after the running time of program A is finished, either to disable or to reset watchdog timer.

When program A has problems that cause system shut down, the system can be rebooted by watchdog timer when the value of watchdog timer has counted down to 0.



Sample Program

Assembly sample code :

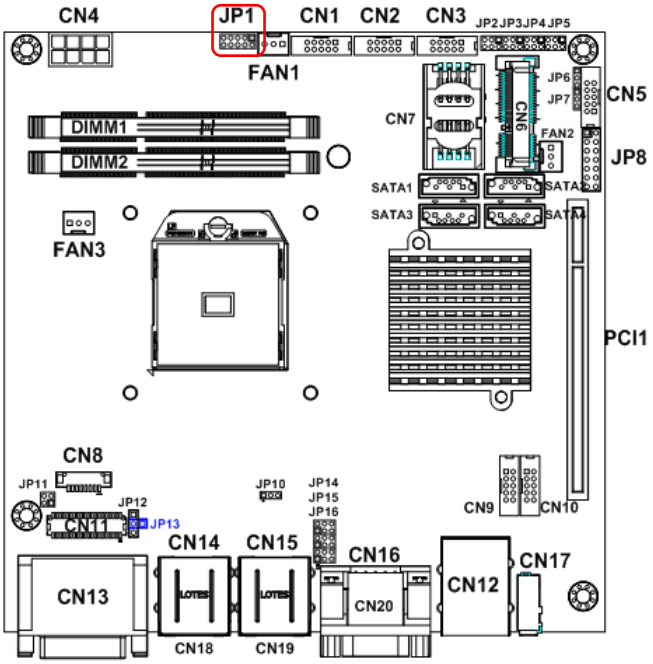
```
;Enable WDT:
mov     dx,2Eh
mov     al,87h           ;Un-lock super I/O
out     dx,al
out     dx,al

;Select Logic device:
mov     dx,2Eh
mov     al,07h
out     dx,al
mov     dx,2Fh
mov     al,08h
out     dx,al


;Select WDT function:
mov     dx,2Eh
mov     al,30h
out     dx,al
mov     dx,2Fh
mov     al,01h
out     dx,al

;Set Second or Minute :
mov     dx,2Eh
mov     al,F5h
out     dx,al
mov     dx,2Fh
mov     al,Nh            ;N=00h or 08h(see below  Note)
out     dx,al

;Set base timer :
mov     dx,2Eh
mov     al,F6h
out     dx,al
mov     dx,2Fh
mov     al,Mh            ;M=00h,01h,...FFh (hex),Value=0 to 255
out     dx,al            ;(see below  Note)

;Disable WDT:
mov     dx,2Eh
mov     al,30h
out     dx,al
mov     dx,2Fh
mov     al,00h           ;Can be disabled at any time
out     dx,al
```

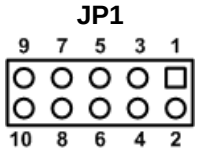
Note*:*
*If **N**=00h, the time base is set to second.*
***M** = time value*
00: Time-out Disable
01: Time-out occurs after 1 second
02: Time-out occurs after 2 seconds
03: Time-out occurs after 3 seconds
.
.
FFh: Time-out occurs after 255 seconds

Appendix B
Digital I/O

About Digital I/O

The onboard digital I/O has 8 bits. Each bit can be set to function as input or output by software programming. In default, all pins are pulled high with +5V level (according to main power). The BIOS default settings are 4 inputs and 4 outputs where all of these pins are set to 1.





Pin	Signal	Pin	Signal
1	DI0 (Bit0)	2	DO0 (Bit 4)
3	DI1 (Bit1)	4	DO1 (Bit 5)
5	DI2 (Bit2)	6	DO2 (Bit 6)
7	DI3 (Bit3)	8	DO3 (Bit 7)
9	GND	10	GND

Digital I/O Programming

Assembly sample code :

Set functionality:

```
;Start set DIO program:
mov     dx,2Eh
mov     al,87h          ;Un-lock super I/O
out     dx,al
out     dx,al

mov     dx,2Eh
mov     al,29h
out     dx,al
mov     dx,2Fh
mov     al,00h
out     dx,al
```

```
mov     dx,2Eh
mov     al,2Ch
out     dx,al
mov     dx,2Fh
mov     al,02h
out     dx,al
```

Digital Input:

```
;Programming DI[O..3] as input.
mov     dx,2Eh
mov     al,07h
out     dx,al
mov     dx,2Fh
mov     al,08h
out     dx,al

mov     dx,2Eh
mov     al,30h
out     dx,al
mov     dx,2Fh
mov     al,04h
out     dx,al

; Set DIO digital input pins value.
mov     dx,2Eh
mov     al,E4h
out     dx,al
mov     dx,2Fh
mov     al,FFh
out     dx,al

;Read DIO digital input pins value.
mov     dx,2Eh
mov     al,E5h
out     dx,al
mov     dx,2Fh
in      al,N            ;Bit0~3 are DI0~3 state (1 High, 0 Low)
                        ;(see below  Note1)
```

Digital Output:

```
;Programming DO[O..3] as output.
mov     dx,2Eh
mov     al,07h
out     dx,al
mov     dx,2Fh
mov     al,09h
out     dx,al

mov     dx,2Eh
mov     al,30h
out     dx,al
mov     dx,2Fh
mov     al,02h
out     dx,al

; Set DIO digital output pins value.
mov     dx,2Eh
mov     al,E4h
out     dx,al
mov     dx,2Fh
mov     dx,00h
out     dx,al
```

```
mov     dx,2Eh
mov     al,E5h
out     dx,al
mov     dx,2Fh
in      al,M            ;Bit0~3 are DO0~3 state (1 High, 0 Low)
                        ;When M=FF, all DO pins are high
                        ;(see below Note2)
```

Note1*:*
*The **N** has 4 bits. Every bit's value is either "1" or "0".*
" 1" means that the bit is input high.
" 0" means that the bit is input low.

Ex:

*1. **N**=00h=00000000b*

NA	NA	NA	NA	DI3	DI2	DI1	DI0
0	0	0	0	0	0	0	0

*2. **N**=08h=00001000b*

NA	NA	NA	NA	DI3	DI2	DI1	DI0
0	0	0	0	1	0	0	0

*3. **N**=0Fh=00001111b*

NA	NA	NA	NA	DI3	DI2	DI1	DI0
0	0	0	0	1	1	1	1

Note2*:*
*The **M** has 4 bits. Every bit's value is either "1" or "0".*
" 1" means that the bit is output high.
" 0" means that the bit is output low.

Ex:

*1. When **M**=FFh*

NA	NA	NA	NA	DO3	DO2	DO1	DO0
1	1	1	1	1	1	1	1

*2. When **M**=FCh*

NA	NA	NA	NA	DO3	DO2	DO1	DO0
1	1	1	1	1	1	0	0

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